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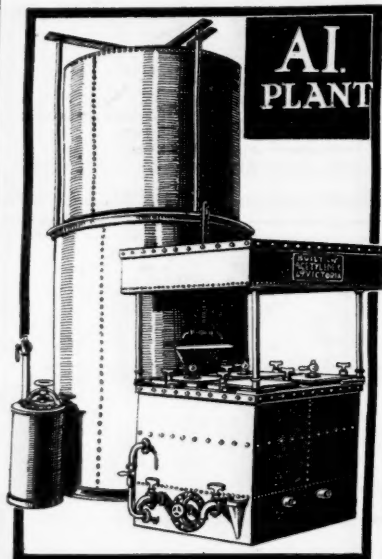
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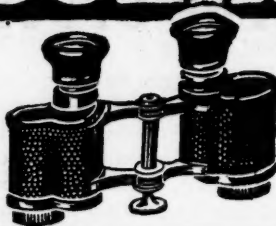
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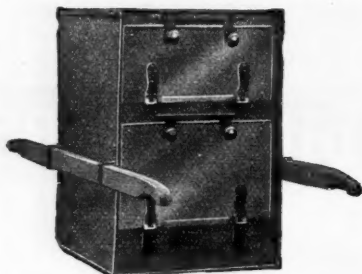
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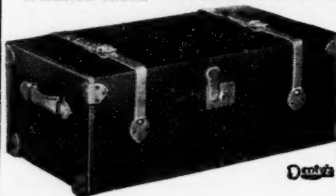
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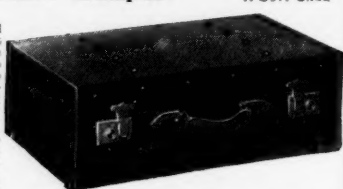
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FIELD MARSHAL GEBHARDT LEBERECHT VON BLÜCHER,
PRINCE OF WAHLSTADT.

*From a Sketch in the Museum of the Royal United Service Institution., made
on the occasion of his visit to England in 1814.*

(See also page 1177.)

ERRATUM.

In the article on "The Rifle: A Weapon of Precision," by Captain J. Hardcastle, in the July JOURNAL, the formula in the footnote on page 977 should read $l n^{0.88} = 99$, and not as stated.

ROYAL UNITED SERVICE INSTITUTION.

AUGUST, 1912.

SECRETARY'S NOTES.

I.—NEW MEMBERS.

The following officers joined the Institution during the month of July :—

Lieutenant C. F. B. Winterscale, King's Shropshire Light Infantry.
Captain Hon. J. C. Lyttleton, M.P., Worcestershire Hussars.
Captain A. C. G. Luther, K.O. Yorkshire Light Infantry.
Captain J. C. Markes, Leinster Regiment.
Lieut.-Colonel H. D. Spencely, 6th Bn. King's Liverpool Regiment.
Lieutenant A. C. Petherick, R.N.
Lieutenant H. Le M. Brock, Royal Warwickshire Regiment.
S. McCance, Esq., late Lieutenant, 11th Middlesex Rifle Volunteers
Captain R. M. Luckock, K.O. Royal Lancaster Regiment.
Lieut.-Colonel N. A. L. Corry, D.S.O., Grenadier Guards.
Lieutenant A. M. Clark, R.N. (retired).
Lieutenant J. N. Grant, R.N. (retired).
Assistant-Paymaster R. G. T. Sennett, R.N.
Captain R. D. Barbor, Army Service Corps.

II.—LECTURES.

The following lectures have been arranged for the coming autumn session. The lecture card will be issued early in October :—

- | | |
|----------------------------------|--|
| <i>Wednesday, October 16th.</i> | "A Corrugated Iron Ship." By Captain G. S. MacIlwaine, R.N. |
| <i>Wednesday, October 30th.</i> | "Dogs for War Purposes." By Major E. H. Richardson, late Notts and Derbyshire Regiment. |
| <i>Wednesday, November 6th.</i> | "Some Problems of British Coast Defences." By Major-General L. B. Friend, C.B. |
| <i>Wednesday, November 20th.</i> | "Courts Martial of the Peninsula Army, 1809 to 1814." By Professor C. W. C. Oman, M.A., F.S.A. |
| <i>Wednesday, November 27th.</i> | "Co-operation between Artillery and Infantry." By Major C. E. D. Budworth, M.V.O., R.H.A. |
| <i>Wednesday, December 4th.</i> | "Ireland and Imperial Defence." By Major-General E. S. May, C.B. |
| <i>Wednesday, December 11th.</i> | "Regimental Bands, their history and rôle of usefulness." By Second-Lieut. J. Mackenzie Rogan, M.V.O., Mus. Doc., Coldstream Guards. |

This meeting will take place at the Queen's Hall, Regent Street, Messrs. Chappell & Co. having kindly placed it at the disposal of the Institution. The lecture will be illustrated by the full band of the Coldstream Guards, and also by a band using instruments of the period in which regimental bands were formed. The Council anticipate that there will be a very large attendance of members and their friends.

III.—MUSEUM PURCHASE FUND.

This fund has been opened with the object of purchasing suitable exhibits which are from time to time offered to the Museum, and which are put up for sale at various auctions. The Council hope that it will receive support from members of the Institution, and especially those interested in the Museum.

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Already acknowledged	12	7	0
Lieut.-Colonel R. H. Fawcett	5	0	0

IV.—REGIMENTAL COLOURS.

The Institution is prepared to arrange for the repairs to regimental colours and cavalry standards, in service or otherwise. Enquiries having been made as to the cost of such repairs, the Secretary begs to state that the average cost is about £4 a colour, of which the Institution only receives 10s. to cover the cost of materials, carriage, etc.

V.—WELLINGTON AND WATERLOO EXHIBITION (Preliminary Notice.)

The Council have decided to hold, in 1915, an Exhibition of Wellington and Waterloo relics, and hope that members of the Institution and others possessing such relics and articles of interest will kindly lend them when the time comes. They are giving this early notice, as it is understood that other exhibitions may be organized of a similar description.

VI.—ADDITIONS TO THE MUSEUM.

- (3383). Guidon of the Wollaton Troop of the Nottinghamshire Gentlemen, Yeomanry Cavalry, bearing the cypher of King George III. and the motto "Our God, our Country, and our King." The Guidons, of which this is one, were presented to the regiment in 1795.—Deposited by Colonel C. W. Trotter, South Notts. Hussars.
- (3384). Guidon of the Wollaton Troop, South Nottinghamshire Yeomanry Cavalry, bearing the Cypher of Queen Victoria, and the motto "Honeste Audax."—Deposited by Colonel C. W. Trotter, South Notts. Hussars.
- (6473). Miniature of the Grand Cross of the Order of the Bath, which formerly belonged to Field-Marshal the late Duke of Cambridge, K.G.

The Crosses of those Knights who were also Knights of the Order of the Garter, were commanded by King George IV. to be worn from an Imperial Crown. Members of the Royal Family who were G.C.B.'s also wore the badge in the above manner.—Given by Lieut.-Colonel A. St. L. Glyn, 10th Bn. Middlesex Regt.

- (6474). Cross of the Légion d'Honneur picked up on the field of Waterloo, the day after the battle, by Mr. Palmer, an American; it was given by this gentleman's nephew to Sir John Furley, at Versailles in 1870.—Given by Sir John Furley, Kt., C.B., D.L.

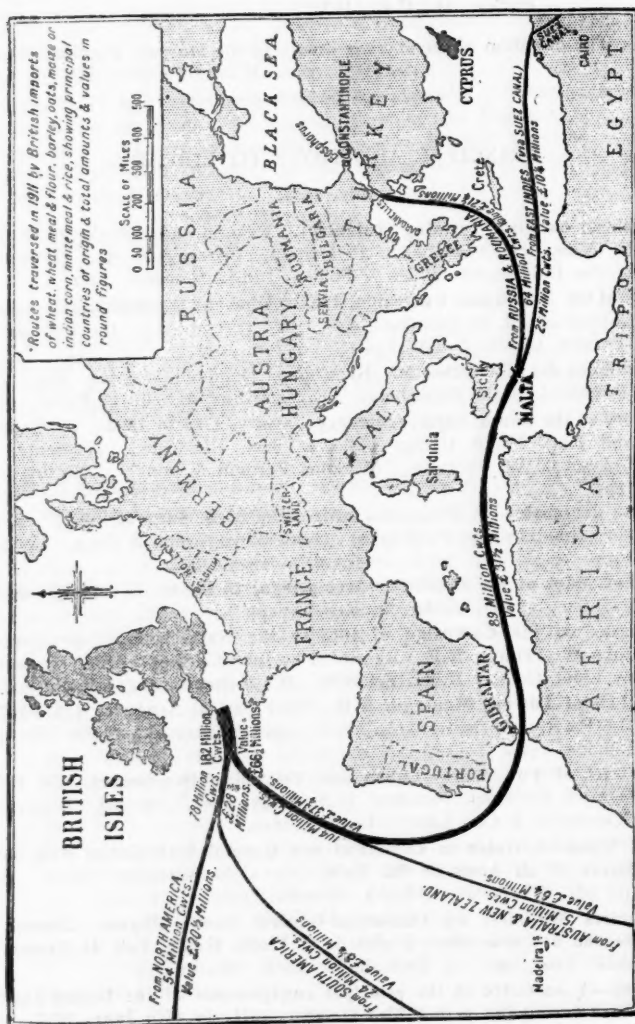
The attention of members is drawn to the Museum Purchase Fund.

PRINCIPAL ADDITIONS TO LIBRARY.

July, 1912.

- Catechism on Field Training (Infantry).** Revised and brought up to date by Colonel H. O'Donnell. 5th Edition. Crown 8vo. 3s. (Presented by the Publishers) (Gale & Polden, Ltd.). London, 1912.
- Story of the Napoleonic Campaign, 1805. Ulm and Austerlitz.** By Lieut.-Colonel H. M. E. Brunker. 8vo. 5s. (Presented by the Publishers) (Forster, Groom & Co., Ltd.). London, 1912.
- Grundlagen der Kriegstheorie.** By Colonel Reinhold Wagner. 8vo. 12s. (Presented by the Publishers) (E. S. Mittler & Sohn). Berlin, 1912.
- History of the South Notts Yeomanry Cavalry, 1794 to 1894.** By Captain and Hon. Major George Fellows. 8vo. Illustrated. (Presented by Colonel C. W. Trotter) (Thomas Forman & Sons). Nottingham, 1895.
- British Citizenship—A Discussion initiated by E. B. Sargant.** 8vo. 2s. 6d. (Presented by the Publishers) (Longmans, Green & Co.). London, 1912.
- Ancient Maps of the Seychelles Archipelago, 25 in. by 17 in.** (Presented by Lieut. M. H. Anderson, R.N.).
- Remarks on the Campaign of 1815 in the Netherlands.** By Captain John W. Pringle, R.E. Reprinted by John Curling. 8vo. (Presented by Lieut.-Colonel R. H. Fawcett) (C. Paternoster). Hitchin, 1861.
- The Life of Edward Montagu, K.G., First Earl of Sandwich (1625-1672).** By F. R. Harris. 2 vols. 8vo. 24s. Illustrated. (John Murray). London, 1912.
- Memories of Two Wars—Cuban and Philippine Experiences.** By Brig.-General Frederick Funston, U.S. Army. 8vo. 12s. 6d. Illustrated. (Constable & Co., Ltd.). London, 1912.
- Staff Work—A Guide to Command and General Staff Duties with small forces of all Arms in the Field.** By Colonel Hubert Foster. 8vo. 3s. 6d. (Hugh Rees, Ltd.). London, 1912.
- Mémoires Militaires du Lieutenant-Général Comte Roguet, Colonel en Second des Grenadiers à pied de la Vieille Garde, Pair de France.** 4 vols. 8vo. 24s. (J. Dumaine). Paris, 1862-65.
- Tripoli—A narrative of the principal engagements of the Italian-Turkish War during the period 23rd October, 1911, to 15th June, 1912.** By Lieut.-Colonel G. Ramaciotti. Crown 8vo. 2s. 6d. (Presented by the Publishers) (Hugh Rees, Ltd.). London, 1912.
- The Rise and Development of Military Music.** By H. G. Farmer. Crown 8vo. 3s. 6d. Illustrated. (Presented by the Publishers) (William Reeves). London, 1912.

GRÉAT BRITAIN'S GRAIN SUPPLY THROUGH THE MEDITERRANEAN.



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THE JOURNAL
OF THE
ROYAL UNITED SERVICE INSTITUTION.

VOL. LVI.

AUGUST, 1912.

No. 414.

[Authors alone are responsible for the contents of their respective Papers.]

MILITARY ESSAY, 1911.

SECOND PRIZE ESSAY.

Subject:—

“THE BEST NATIONAL SYSTEM FOR PROVIDING THE NECESSARY MILITARY FORCE: (I) TO SECURE THE SAFETY OF THE UNITED KINGDOM ON LAND; (II) TO SUPPORT THE DEFENCE OF THE EMPIRE; (III) TO ASSIST IN MAINTAINING THE BALANCE OF POWER IN EUROPE.”

By MAJOR H. L. PRITCHARD, R.E.

Motto: “Checkmate.”

A FEW years ago this essay would have had to begin with an exhaustive review of the military liabilities of the British Empire, and the limits of an essay would have been reached before the author could have satisfied a reader that he had worked out a reasonable case for the existence of military forces of definite dimensions.

But, in the last few years, public opinion has been roused to take an increasing interest in this important question. Numbers of able writers, including the foremost men of the day, and particularly our most celebrated soldiers, have applied themselves to the question, and have thrashed the matter out to the last detail in the columns of the newspapers, in magazines, in the special periodicals of the National Service, and other kindred Leagues; in books devoted entirely to the subject, and by speeches in and out of both Houses of Parliament.

Unanimity has certainly not been, and probably never will be, obtained; but no one can complain that all possible aspects of the case have not been placed before him, and even thrust upon his attention. Each individual, if he takes the trouble, can find all the information on the subject, and there is no

reason why he should not attempt to sift it for himself, and to base upon it an opinion of his own.

It would, therefore, be a work of supererogation for me to attempt to work out "*de novo*" what military forces are required by the British Empire in war, and in peace.

Yet, before we can devise a scheme for providing personnel for an Empire's forces, it is obvious that we must first ascertain what forces are required.

By examining the valuable and comprehensive information put before the public by far abler pens than mine, one can arrive at a clear statement of the military liabilities of the Empire, which may be said to approximately represent the opinion of many of our most eminent public men; and, though this statement would be challenged by other equally eminent men, yet the author in his search for a basis for his essay is compelled to make his choice among the conflicting opinions which exist, and, therefore, sets down here the conclusions which appear to him to have been most satisfactorily proved. I make a plain statement of them unsupported by any arguments, since these have been published in abundance on both sides.

It is not contended that we should prepare forces which would be capable of dealing with all these military liabilities simultaneously. All we can ask the nation to submit to is to be prepared for the most serious contingency, and to possess a latent power of expansion. We must trust our Foreign Minister to arrange that, if other wars are thrust upon us simultaneously, we shall not be without allies to assist us, and to give time for expansion. If we are strong we shall not be without friends; and, though a world-wide Power must necessarily have many enemies, it follows equally that the interests of many are identical with ours.

MILITARY LIABILITIES OF THE BRITISH EMPIRE.

1. It is vital for us to prevent the acquisition of Holland or Belgium by Germany, either by conquest, or by peaceful penetration. If the German fleet were based upon German ports along the Dutch and Belgian coast, there would no longer be found anyone to deny that invasion of our islands was not only "logically possible," but also more than "reasonably probable."

2. It follows from (1) that any quarrel between France and Germany is our quarrel, and that we must support France by placing where required within ten days of the outbreak of war at least 200,000 first-class troops, and raise that number to 300,000 as soon as possible.

3. In order that the British Isles may be secure from the invasion of 250,000 men, and that the fleet may be released from our shores to seek out and destroy the enemy's fleets, and to protect the lines of communication of the Empire which lie

upon the ocean, and further, that there may be no hesitation in ordering the Expeditionary Force to embark, in fact, to quote Sir Ian Hamilton, in order that we shall not "sacrifice our initiative and imperil all that we stand for in the world," it is necessary for us to be able to mobilize for Home Defence, quite apart from the Expeditionary Forces, the following trained, well-organized and equipped, forces, which also provide the latent powers of expansion on which we can count in the last resort for any service in a supreme crisis:—

	Men.
(a) For defence of home fortresses covering naval bases and important harbours ...	150,000
(b) For local internal defence of communications and strategic points	100,000
(c) Field force to defeat invaders. These must prior to invasion be separated, while the usual percentage of unfits must be ded- ucted, so that only two-thirds can be relied upon to fall upon invaders within 24 hours	500,000
(d) To replace wastage in (a) (b) (c)	250,000
	<hr/> 1,000,000 <hr/>

4. We must at all times keep up the following forces abroad for the maintenance of internal order in the undermentioned countries, and to secure them from external attack until they can be reinforced:—

	Men.
India	73,000
Egypt and Sudan	15,000
Crown Colonies and Oversea Fortresses	30,000
	<hr/> 118,000 <hr/>

Canada, Australia, New Zealand, South Africa.	} responsible for their own internal order and security from attack until rein- forced.
--	---

5. In the event of a Russian advance upon India, we should require to have in the field 12 *months after* the outbreak of war, and to maintain throughout the war:—

	Men.
Native army raised by special recruiting from 150,000 to	250,000
Troops from United Kingdom	300,000
From the Dominions during the next ten years we might count upon 50,000, and later upon more	50,000
	<hr/> 600,000 <hr/>

6. In the event of Turkey, subsidized by German money, and assisted by German advice and resources, building the short length of railway which would bring her railway system down to the Suez Canal, and then attacking Egypt, at the same time appealing to religious fanaticism in that country and the Sudan, we should require to send reinforcements of 100,000 British and 50,000 Indian troops.

7. In the event of war between the United States and Canada, we should require to despatch 200,000 men so as to reach the other side of the Atlantic within a month. These, added to the Canadian forces, would probably suffice for the first few months of war, after which we should endeavour to add at least 100,000, while Canada and the other Dominions would have to be relied on to produce at least 150,000 more. These numbers to be maintained in the field throughout the war. The fleet in the Pacific would have to be reinforced, a measure which could only be possible if the force referred to in (3) existed.

8. If our present excellent relations with Japan should unfortunately undergo a change and war result; a large portion of the fleet would have to proceed to the Pacific to prevent the invasion of New Zealand and Australia. It would be desirable also to despatch a reinforcement of 50,000 troops to those Dominions, and to Eastern possessions. These measures could not be taken unless the force referred to in (3) existed.

9. A war with Afghanistan would necessitate the employment of all the troops, British and Indian, at present in India; since, besides the forces operating in Afghanistan, considerable numbers would be required to keep the border tribesmen in check, and to ensure order in India itself.

10. In Abyssinia it is conceivable that it might be necessary to send 40,000 Indian troops and 20,000 British troops to co-operate with the Egyptian Army.

11. It is necessary to be able to despatch at 48 hours' notice a force of 20,000 men, either to carry out some small expedition, or else as a first reinforcement while diplomacy is still struggling to avert war. This force must be available without calling up reserves or ordering any partial mobilization.

FORCES REQUIRED TO MEET LIABILITIES.

Surveying the foregoing formidable statement of liabilities, and bearing in mind that we do not propose to do more than prepare to meet the worst case that may arise, and to provide latent powers of expansion, of what assets should we be possessed if we are to escape military bankruptcy?

It is necessary to beware of the favourite tendency to make an estimate of what is supposed to be the limit that the country will stand, which varies very much according to the opinion of the estimator. Taking this purely arbitrary basis, the military

reformer then proceeds to construct an army out of this assumed number of men. But we must remember that our enemies are not bound to limit their forces to what "this country will stand," and, if what our country has stood in providing men for the Army is found insufficient on the day of battle, then it will have to stand very unpleasant consequences. A man who reasons thus is like a chess player who works out a most ingenious set of moves on the assumption that his opponent is going to fall in with them, and who pursues his plan, regardless of the unorthodox moves of his opponent, until he is interrupted by the words "check mate."

It is, therefore, at our enemies' forces that we must first look, and estimate what proportion of them we may be called upon to meet, and it is this procedure which has been followed by the able men whose views I have endeavoured to summarize in the foregoing statement of liabilities.

There are those who ask, "Why should the Mother country bear such a burden? Why should not the Dominions share it?" In the figures I am about to give it is assumed that the Dominions will willingly take their share by, in the first place, making themselves reasonably secure against invasion, and thus assisting our fleet, and in the second place, by sending 50,000 men to join our Expeditionary Force in a war of importance, either on the Continent or in India.

In the event of war with the United States it is assumed that Canada will still further increase this force by 100,000 men, additional to her ordinary Militia.

Until we have an Imperial Parliament in which the Dominions are represented we cannot tax them in money or men, so that no guarantee of the above forces can be given; but, judging by past experience, and by the present actions of the Dominions, we are justified in expecting that they will willingly respond to the foregoing programme. Their population and resources multiply rapidly, so that in years to come we may hope for more assistance from them, but, for the next decade at least, the above may be taken as a reasonable estimate of their capacity to assist us.

The foregoing statement of military liabilities provides a definite basis on which to estimate the forces that must be created by our national military system. This estimate may be briefly summarized as under:—

- A. 118,000 men garrisoning our Possessions oversea (excluding Dominions and excluding native troops).
- B. 200,000 men to form a first-class Expeditionary Force, ready to embark within a week for war in any part of the world. Out of this force 20,000 must be always available at war strength without calling up reserves or ordering a partial mobilization.

- C. 30,000 men to form a First Reserve for the Expeditionary Force, to supply war wastage.
- D. 1,000,000 men to form a Home Defence Army, and a Reserve from which trained men may be obtained, at first voluntarily, but in a supreme crisis, compulsorily, to augment and maintain the Expeditionary Force during a long war of supreme importance.
- E. The Dominions to be capable of maintaining their defence until reinforced by the Expeditionary Force, while we confidently hope that, in the time of trial, they will place 50,000 men alongside our Expeditionary Force, increasing that number by 100,000 Canadians in the event of war with the United States.

I take the foregoing as the task which is set before me in this essay, and proceed to try and construct a system which shall produce the desired forces.

FACTS AND CARDINAL PRINCIPLES DRAWN FROM PAST EXPERIENCES.

First let me see what fixed "data" we have to go on. What facts and cardinal principles can we find to guide us by a study of past experience?

In the discussions which have been carried on upon this subject there seems to have been unanimity on one point at least, *viz.*, that for oversea garrison work during peace only voluntarily enlisted men can be employed; for such duty compulsion is out of the question.

For oversea expeditions voluntary enlistment must also be employed, but for first-class oversea wars of supreme importance, affecting the existence of the Empire, especially if conducted on the European Continent, there are many who say that, when we have exhausted all the Volunteers, and not till then, it will be necessary for Parliament to pass a special Act ordering the use of all Forces that may exist.

If we follow these principles it means that our 118,000 oversea peace garrison, and our 200,000 Expeditionary Force, with their First Reserve of 30,000, must be voluntarily enlisted; but behind them, for use in the last resort, must stand a trained army of 1,000,000, who, as they cannot be obtained voluntarily, must be obtained by compulsion.

A study of the recruiting returns for some years past will show that there is extraordinarily little variation in the numbers of men who come forward annually as voluntary recruits for the Regular Army, that is for service anywhere in the world, either in peace or war. Conditions of service have been varied greatly; all sorts of alterations have been made in the bait to

make it more attractive. The pay has been raised considerably; barracks have been made more comfortable, and barrack life less irksome; there have been several experiments made in altering the period of enlistment, and the proportions between service with the Colours and service in the Reserve have been varied; but with all these alterations there has been surprisingly little variation in the numbers of recruits offering themselves. Practically we may say, that every year approximately 38,000 suitable men come forward and say, "We don't know anything about the conditions of service, and we don't want to know about them, we are going to enlist," while the rest of the nation says, "We don't believe a word you say about the advantages of the Army, and we don't mind how much you improve the conditions, we are not going to enlist voluntarily for general service during peace."

The numbers enlisted annually for the Regular Army vary between about 34,000 and 40,000. When there is talk of war, or trade is very bad, possibly 40,000 are obtainable. If neither of these aids to recruiting are at work, and more than 38,000 are wanted, the physical standard has to be lowered. At present we are enlisting only about 35,000 men annually, but owing to the reductions made in 1904 in the establishment of the Regular Army, the figure 35,000 supplies sufficient recruits. Formerly it was necessary to obtain 37,000 to 38,000 annually to keep up the establishment of the Regular Army, and in the South African War, of course, this demand rose and met with an adequate response. While we require only 35,000 men annually we are able to do a certain amount of picking and choosing, but the statistics conclusively prove that 38,000 is very near the limit of suitable men who may annually be relied on as available recruits for the Regular Army, and this is about the average enlisted annually during the last 12 years.

Similarly, about 10,000 men (after deducting those who pass on to the Regular Army) come forward annually for the Militia service, now called Special Reserve.

Again the utmost efforts on the part of all classes of society and the employment of every means of rousing enthusiasm will not raise the strength of what used to be the Volunteer Force, but is now the Territorial Force, above approximately 270,000 men.

The utmost attention has been given to the subject of obtaining recruits, great ingenuity in devising attractions and appealing to patriotism, unremitting labour in seeking out and drawing upon all sources, in bringing to bear all possible influences, have been constantly at work on this problem, notably during Lord Haldane's tenure of the War Minister's appointment. Nevertheless the figures I have given remain practically the same.

I wish to lay emphasis on the importance of the inelasticity of these figures, because it affects all army schemes, and par-

ticularly such as a long service army for abroad and a short service army for home, or a small number with the Colours and a host in the Reserve.

There are the numbers available for the Regular Army, 38,000 per annum. You can have them with the Colours or you can have them in the Reserve, or you can have some with the Colours and some with the Reserve, but you cannot have them all with the Colours and also all with the Reserve, and we must beware of schemes which assume that larger numbers will be available, and which multiply them into a huge army by passing imaginary men into the Reserve after short periods with the Colours.

This was very clearly exemplified when Lord Middleton introduced three years' colour service and nine years' reserve service as the period of enlistment. At the end of three years there were not enough men with the Colours to fill the garrisons abroad. Instead of going abroad they had gone to the Reserve, but of course more men should have come forward to serve with the Colours. Quite so, but they did not. We were up against the inelastic figure, 38,000.

It may be that we have not exhausted all devices to increase that figure. The author is bold enough to think that he is going to show how that figure may be made to expand *a little*, but he is going to beware of being too sanguine on this point. In our schemes we will keep ourselves not very far away from that figure 38,000 and the other figures I have quoted.

What does that 38,000 give us? A rough rule of thumb gives us a result which proves very fairly accurate. A thousand recruits per annum, enlisted for twelve years, provide a force of ten thousand; so that an annual contingent of 38,000 men produce a force of 380,000. This year's Army Estimates show a total of 380,000 on the Regular Establishment at home and abroad, and including Army Reserve, but not Special Reserve. But it must be remembered that we still have in the Reserve the men enlisted during the war boom, when the establishment of the Army was higher than it now is. The strength of the Reserve will shortly drop, and, if Army Establishment with the Colours remains the same as at present, about 35,000 recruits will be enlisted annually providing a total force of 350,000 men; as I said before, we can have these with the Colours, or we can have them with the Reserve, but few will now deny that, taking into consideration the conflicting conditions of the economy of a big Reserve, the necessity for a garrison abroad, the necessity for establishments at home of a definite size to secure efficient training and provide an Expeditionary Force, the waste of money in transporting men abroad for short periods, and bringing them back, the best proportions of colour and reserve service in a twelve-year enlistment are either seven and five, respectively, or eight and four.

With seven years' colour service and five years' reserve service throughout the principal arms, the present establishment of the Army with the Colours produces about 350,000 men. It will probably reach this normal figure in 1913, and the normal distribution would be :—

	Men.
Abroad	117,000
With the Colours at Home (of whom 35,000 are unfit and immature soldiers)	125,000
In Reserve, excluding Special Reserve	108,000
Total	350,000

At the present moment (June, 1911) the Reserve is about 136,000 strong, but that is due to two causes: (1) the higher Establishment with the Colours prior to 1904; (2) the large number passed to the Reserve by Lord Middleton's experiment of three years' colour and nine years' reserve service. In 1913 these disturbing conditions will pass away, and the Reserve will have dropped to about 108,000, so that we may take the normal distribution of the army as above, when the peace establishment is as fixed at present, and when 35,000 recruits are enlisted annually.

The 10,000 (excluding those who go on to the Regular Army) who come forward every year to serve under Militia conditions give us a Special Reserve of 63,000 men, who are principally to be used to replace the wastage in the Regular Army during war.

What expansion or contraction may we expect in the above numbers if the whole manhood of the nation receives compulsorily a sound military training? Sir Ian Hamilton says the numbers would contract, but I respectfully submit that he has not adduced one relevant fact in support of his contention, whereas Lord Roberts, in his reply to Sir Ian Hamilton's book, quotes several facts which point to the conclusion that the more training our nation receives the more is it likely to furnish recruits for a voluntary overseas army. In the first place, of course, the compulsorily trained army would not be allowed to compete with the voluntary one. Recruits would not be taken for the former until they had reached the age (19) under which nearly all the voluntary recruits are obtained. Moreover, men could at any time transfer to the voluntary army, in fact, they would be encouraged to do so. Lord Roberts shows how the great proportion of men who came forward during the South African War had had previous military training of some sort, while the proportion of men without any previous training was naturally small. Lord Roberts points to the fact that 44 per cent. of men who have tried the Special Reserve training pass on to the Regulars, while over 50 per cent. of the *Spectator* Company joined the Regular or other forces. These, and other equally cogent facts—quoted by Lord Roberts—justify us in

assuming that, if we adopt universal compulsory military training for the Home Defence Army, we may expect to increase the number of voluntary recruits for the Regular Army by a small proportion during peace, and by an exceedingly large proportion during a war of supreme importance.

Now let us see whether we have any past experience to guide us concerning the proposal put forward by some, that we should have a long service voluntarily enlisted army for peace garrison work abroad, and a short service voluntarily enlisted home army working up a reserve which will be available for oversea wars. I have already alluded to that inelastic figure 38,000, which restricts the second part of this proposal to definite dimensions, but now I am looking for past experience on the subject of the long service army for oversea garrison.

It has been tried and discarded.

Before the Mutiny India had its own long service European force. The Royal Commission which considered the subject after the Mutiny reported against it, and brought ample evidence to support their contention, evidence which is equally applicable to-day. They showed that a long service army abroad vegetates, it gets far behind the European standard both in mind and body. Disease undermines its efficiency. Pensions and invaliding make it expensive. The old soldier is not as good as the young soldier. He is too much of an old soldier. Up to a certain time, probably up to twelve years' service, the average man improves as a soldier, after that he deteriorates, at first slowly, but at an ever increasing speed. The organization and training of such an army will always be found to be behind the European standard. Fresh blood from home in all ranks of the Army is constantly required, and, if those who have gone abroad are to retain their efficiency, they must not stay abroad too long.

We even have the "*reductio ad absurdum*" example to guide us in the case of the regiment which was permanently quartered in Australia. After forty years it was decided to recall it, but the order had to be cancelled, as no one could find the regiment, they were squatters all over the Australian Continent. In these days of excellent communication and facilities for correspondence such a thing could not of course occur, but the underlying principle remains at work to a less degree.

Next we turn for guidance to the Cardwell System. What are its principles? They have governed our army system for a considerable period, and, in their time, have done their work well. Can we still continue to utilize them either partially or in their entirety? That they do not now give us an army of the required size is simply due to the fact that the forces which our enemies might now bring against us exceed those which we formerly had to meet.

The underlying principle of the Cardwell System is the rejection of the "Depôt" as the means of training men, and the

employment of a fighting unit for this purpose. A certain sized garrison has to be maintained abroad; each unit abroad requires men to be recruited for it at home, to be kept at home until they are fit to go abroad, and to receive their training while at home. This work might be done, after a fashion, by a *depôt* worked by three or four officers and a few N.C.O.'s. Such an organization can give recruit training, it cannot give more; it cannot make a man into a soldier, and, what is more important still, it cannot itself become a unit of an army. Its combatant value is "nil." A *depôt* cannot be turned into a fighting unit, since officers and N.C.O.'s cannot be improvized to raise the cadre of a *depôt* to that of a fighting unit. If the units abroad only required a supply of partially trained recruits, possibly *depôts* would suffice, but, in time of war, the garrisons abroad expect an army to come to their assistance, and this the *depôts* cannot supply.

I do not think I need be asked to labour this point, since the military opinion on the subject of *depôts* is absolutely solid. I believe that without one single exception every soldier who has been asked his opinion upon keeping only *depôts* at home for training purposes has pronounced against it. Each civilian War Minister in turn has been tempted by the economy of the proposal, and has examined the question, but all have been impressed by the absolutely solid weight of military opinion against it. Probably, also, they have been mindful of the "Nemesis" that would overtake them on the day when the nation calls upon them to produce an Expeditionary Force.

The *depôt* is therefore restricted in its functions in peace to collecting recruits and administering reservists, while, in war, it takes over the unfit and immature soldiers from the fighting unit, and continues their training till ready to join their unit.

Consequently the Cardwell System arranges, that every unit abroad has its link unit at home, with a full cadre, but reduced establishment of men, feeding the unit abroad with drafts of trained men. The period of enlistment (seven years with Colours and five with the Reserve) provides men with the Colours for the garrisons abroad, and sufficient with the Colours at home to enable efficient training to be given, while it also provides a reserve which, on mobilization, transforms the units at home into combatant units of an army at full strength, *but it does not provide a reserve to meet war wastage.*

It must be noted that, within the limitation of the numbers it provides, the Cardwell System has worked excellently.

We must be careful to guard against one interpretation of the Cardwell System, which would arouse the protests of its author, but which is the favourite theme of the retrenching politician. "If," says that gentleman, "we can show that we have too many troops abroad, then, not only can we abolish the redundant units, but we can also abolish their link units at

home." The fallacy in this lies in the fact that, though the Cardwell System lays down that for every unit abroad there must be a unit at home, it does not say that the number of units at home must not exceed the number abroad. What then determines the number of units at home? Why the size of the Expeditionary Force, of course. What determines the size of the Expeditionary Force? That is determined by the size of that proportion of enemies' forces which it may be required to meet, and which has been defined at the beginning of this essay.

I have explained that the Cardwell System takes as one of its basic principles that, to train for war men must be organized in war units, and the full war cadres of those units must exist in peace. That is to say the leaders and administrators of each unit must exist. The number of men allotted to a unit in peace need not equal the number it requires in war, and it is a universal practice in all armies to keep the peace strength of the privates in the ranks below the war strength, but there is an irreducible minimum in this as in most things. If the peace establishment of a unit be reduced below a certain figure, which of course varies in different arms of the service, then at once the efficiency of the training is impaired out of all proportion to the reduction in establishment. Not only does it then become impossible to give the men proper army training, but it becomes impossible for the "cadres," *viz.*: the officers and N.C.O.'s, to keep themselves trained, and if they lose their efficiency the consequences are most serious. It has been found by experience, that the peace establishments of units, which have to supply drafts for abroad, and train themselves, should not be less than approximately for an infantry battalion 800, for a cavalry regiment 700, and for a battery of artillery 150, excluding officers (see Establishments in Army Estimates).

It has also been found in practice that with these peace establishments, when a unit mobilizes for war, after sending to the *dépôt* its unfit and immature soldiers, it requires to draw on the Reserve for about 50 per cent. of its war establishment.

The next fact to take notice of is one concerning which there is unanimity in theory but not in practice. I do not think anyone denies that the shorter the time available for training men, and the less training they have received, the more efficient must be the officers and N.C.O.'s who have to train them in peace and to lead them in war. Disciplined, well trained men have pulled their officers through scores of times, *vide* the soldiers battles of the Crimea, and well-trained officers and N.C.O.'s have pulled through insufficiently trained men, *vide* those irregular corps in South Africa, which were stiffened with regular officers, but history abounds with the failures of untrained men led by untrained officers and N.C.O.'s.

While all admit this fact, yet we see schemes which eliminate the regular officer and N.C.O. from proposed Home Defence Armies, and we read tirades against the forming of a military

"caste." In the forming of our schemes let us not forget this fact, that the less training a force receives the more necessary is it to employ expert officers and N.C.O.'s to train it, and to lead it.

Next, we must search for facts which will guide us as to the amount of training necessary to make a soldier.

The *Spectator* experiment turned out a first-class infantry company at the end of six months, but we must beware of generalizing too hastily on this basis. In the first place a large proportion of our officers and N.C.O.'s would not claim to be such expert trainers of men as Colonel Pollock and his assistants proved themselves to be. In the second place there were not wanting those who hesitated to grant that the discipline and training would stand the fatigue and monotony of war.

Even though some would assert that six months' training will make an infantry battalion, few, if any, will say that that period suffices to make a cavalry regiment or a battery of artillery. We know that it is here that the Swiss system breaks down, although achieving results that are most creditable. Yet, if we go in for compulsion for our home defence army, there is one cardinal principle to which we must adhere, and that is that the training must occupy the same period for all. There must firstly be no exception on account of class, or wealth, or personal considerations, only the authorized exceptions, such as the physically unfit, those who join the Navy or Regular Army, the mercantile marine, clergymen, etc., etc.; and secondly, the period of training must be the same for all.

We must, therefore, arrive at that period which will give us the minimum standard of efficiency in the cavalry and artillery, a period which will ensure a high standard in the infantry. On the one hand, we must not be carried away by the military officer who wishes to make sure of a highly-finished article, and who might be inclined to interfere to an unnecessary extent with the commercial development of the country; on the other hand, we have to beware of the man of commerce, who thinks an army can be made by intermittent training in the spare time of the men, especially if they do not come under the baneful influence of the regular officer and barracks, and other accessories of military life!!

One fact that bears on this question stands out clearly from past experience, and that is that the spare-time soldier cannot spare more than one week annually for continuous training, and at the most, and with great inconvenience, one fortnight. Consequently, unless we remove a man from commerce for a lengthy period, leaving his place therein to be filled by someone else, we must not claim more than a week, or at most a fortnight, of his time annually.

The accepted statistics show that, if we adopt universal training simultaneously with recruiting voluntarily for a Navy and an Army for general service, then the total number of men

these three services would take annually from the nation is about 200,000, of which 150,000 are for compulsory training, to be returned to commercial life as soon as possible.

This is a small percentage of the population, and cannot affect the commercial life of the nation. It must be remembered that we are not taking the managers, and the foremen, and the mainstays of businesses, we are taking their youngsters, whose places can be filled the next day, and when, next year, we come to the commercial world for another contingent, we say, "Here are the men we took from you last year, all looking for work, let them change places with the men we want to take from you now." But, if you take some men for four months, and some men for six months, and then leave an interval of a few months before taking another contingent, and again call them back for a fortnight or so every year, you constantly alter the supply of men available for commerce, and the business world will say to the youngsters, "We can't have anything to say to you until you have done with this military work for good." It is these intermittent calls on the men's time that paralyze business. Take the men right away for a definite period and have done with it. Don't return them until they have got soldiering into their bones so that it will remain latent within them for the next ten years of their youth, then let them go back free men, unless serious war breaks out, which always dislocates business under any circumstances. That is the point which I wish to emphasize, *viz.*, that we must arrive at the minimum period in which expert officers and N.C.O.'s can turn men into trained disciplined soldiers, and for that continuous period remove the men from the commercial world. At the end of that period return them without any liabilities for further calls during peace, or, if a refresher course is a "*sine qua non*," limit it to one week per annum at a time chosen by each man. We may err with a certain amount of impunity in the length of the initial course of training, but errors in refresher courses would have disastrous consequences.

If this principle is adhered to then there will be no dislocation of the commercial world, and the men themselves will suffer in no way in their commercial prospects.

Have we any other point to consider in deciding on a period of compulsory training? We must not lose sight of the fact that the expert officers and N.C.O.'s who are to carry out the training should be utilized to the utmost. The whole of their time throughout the year should be given to this important work.

Next, we must remember that all seasons of the year are not equally favourable to military training. November to March can be utilized for elementary instruction in barracks, but training in camp, and combined training, cannot be given in these months; May, June, and July are not suitable for manœuvres on a large scale on account of the crops. It must be remembered that we have not only to train each man in

certain individual exercises, the principal part of the training lies in teaching all ranks to work together and in large numbers, to understand their place in the machine, and to turn a mob into an army.

How are we going to do this if we train the men for only four months of the year, as the National Service League purposes? Do they intend to train the whole contingent for the best four months of the year, say June to September? If so, what becomes of the training "cadres" during the rest of the year? Where are the cadres of the fighting units which the men are to fill on the outbreak of war, and which should train them in peace? Are these "cadres" to work four months and rest eight months? If the whole year is going to be employed in three periods of four months each, one-third of the annual contingent receiving training in each period, what sort of training will the September to December, and the January to April men get?

If we choose six months as our period of training the same difficulty exists; either the "cadres" are idle for six months, or there are two trainings per annum, in which case the training from July to December cannot be progressive from squad to company, from company to battalion, from battalion to brigade in camp, and from brigade to divisional or army manœuvres. The nearer we get to the period of a full year for training the smaller are the difficulties till, at the full year, they vanish. If we train for a whole year the expert training cadres, which are also to lead in war, are employed continuously, the men can begin in October, and do their elementary training in the winter. As the summer comes on they form into larger bodies and move into camp, to work up to the culmination of training at the army manœuvres in September.

It is, therefore, important to take note of the influence of the seasons of the year upon the question we are considering.

In any army scheme which we try to construct, we have now to take note of a new factor, which has only recently come into prominence. I refer to the shortage of officers. If we mobilized our Regular Army, Special Reserve, and Territorial Force, we should be short of some 2,800 officers. In the case of war with Russia in India, the latter country expects us to send her 600 officers to complete the mobilization of the forces now in India. In addition to these, several administrative posts created in war have to be filled by officers, and heavy casualties must be expected. This is a matter for which we must make provision in any army scheme that we construct.

I think now that our researches into past experience are concluded; but, before proceeding with the constructive portion of this essay, I will very briefly recapitulate the facts, and the cardinal principles, which exist to guide us, and which we must keep clearly, and constantly, before us, if we wish to avoid schemes which may be ideal, but are not practical.

RECAPITULATION OF FACTS AND CARDINAL PRINCIPLES.

1. For oversea garrisons in time of peace enlistment must be voluntary.
2. For minor oversea expeditions enlistment must also be voluntary.
3. For oversea wars of such supreme importance as to affect Imperial, and even national, existence, when all volunteers have been exhausted, the employment of all forces that may exist should be ordered by Parliament.
4. The numbers of suitable men that may be relied on annually to enlist voluntarily for general service, in peace, or war, at home or abroad, do not much exceed 38,000. At present, with our existing peace establishment, we take only about 35,000 of these, who, with a 12-years period of enlistment, provide about 350,000, of whom the normal distribution is:—

	Men.
Abroad	117,000
With Colours at home, and fit for war ...	90,000
With Colours at home, unfit and immature ...	35,000
In Reserve	108,000
	<hr/>
	350,000

The above figures are in accordance with the rule of thumb, which works fairly accurately in practice, and which states, that 1,000 recruits annually, enlisting for 12 years, provide 10,000 men.

5. The numbers voluntarily accepting Special Reserve terms of enlistment (excluding those who pass on to Regular Army) are approximately 10,000 annually, who provide a Special Reserve of 63,000 men.

6. The strength of the Territorial Force is approximately 270,000 men, which is about the same as the strength of the old Volunteer Force, and all efforts to increase it beyond that figure have so far failed.

7. The above figures are extremely inelastic. They vary very little with the alterations in conditions of service made from time to time, and very little if any expansion can be hoped for.

8. The adoption of universal military training would tend to increase the number enlisting voluntarily in the Regular, or General Service, Forces. This increase would be comparatively small in peace, but very large in war, especially in an important war.

9. A long service Foreign Army has been tried and found unsuitable.

10. A short service Home Army, with long reserve service, takes away men required to fill garrisons abroad, and the

size of the Army it provides is limited by the inelastic figures quoted in (4) and (5).

11. The Cardwell System, working with seven years' colour and five years' reserve service, provides men with the Colours abroad, men with the Colours of the link units at home, and a reserve which on mobilization turns the home units into fighting units of a *limited* Expeditionary Force, but it does not provide a reserve to meet the wastage of war, *nor does it give any powers of expansion behind the Regular Army.*

12. A system of depôts to provide men for garrisons abroad does not furnish trained soldiers, nor trained officers and N.C.O.'s, and a depôt cannot be turned on mobilization into a fighting unit of the Expeditionary Force.

13. Every unit abroad in peace must be fed, not by a depôt, but by a similar unit at home.

14. The home units, in order both to supply drafts for abroad, and to train themselves, must have a minimum peace establishment of (excluding officers) infantry battalion, 800; cavalry regiment, 700; battery of artillery, 150. Reduction below these numbers in units which supply drafts seriously affects the training of all ranks.

15. With the peace establishments laid down in (14) it will be found, that on mobilization, when unfit and immature soldiers are sent to the depôt, units will require to draw on the reserve for 50 per cent. of their war establishment.

16. The number of units at home must not be less than the number abroad; but, subject to this minimum, the number of units of General Service Army at home depends upon the size of the Expeditionary Force.

17. The shorter the period available for training men the more necessary is it that training should be given by professional expert officers and N.C.O.'s in organized fighting units, and not depôts.

18. There is a shortage in the supply of officers, to remedy which means must be found.

19. In adopting universal compulsory military training there must be no exceptions on account of class, or wealth, only on account of physical unfitness, and the other unavoidable exceptions which will be specified later.

20. The period of compulsory training must be the same for all, and for all arms of the Service.

21. The length of period of compulsory military training should be the minimum in which professional officers and N.C.O.'s can turn out disciplined soldiers with the minimum safe standard of training in all arms of the service.

22. Universal military training must be arranged so as to cause the minimum inconvenience to commercial life, and to the careers of the men trained.

23. We may err with a certain amount of impunity in the length of the initial training course, but subsequent calls

upon the men for refresher courses should be studiously avoided. If these subsequent calls are considered essential their duration must not exceed one week per annum, at the time convenient to the men.

24. All seasons of the year are not equally suitable for military training.

25. The training cadres of officers and N.C.O.'s must be kept employed throughout the year.

26. Any training period of less than a year presents several difficulties, whereas a full year gives sufficient training, and is, from all points of view, a very satisfactory period to select.

PROPOSED MILITARY SYSTEM.

Keeping constantly in mind the foregoing facts and cardinal principles, I now proceed to the constructive portion of this essay. In accordance with the basis which I have selected for a scheme, and already defined, the forces which must be created are as under:—

Category A.

In this Category I place the forces which have to be provided by voluntary enlistment for general service in peace or war. They are:—

	No. of N.C.O.'s and men.
1. For peace garrisons oversea	118,000
2. Expeditionary Force, capable of mobilization within ten days, and including 20,000 ready to proceed before general mobilization	200,000
3. Skilled nucleus of fortress garrisons in United Kingdom, principally fortress artillery and fortress engineers (the remainder of fortress garrisons to be furnished by Home Defence Army) ...	15,000
4. Allowance for unfit and immature soldiers sent to depôts on mobilization, and for staff of the latter	50,000
5. N.C.O.'s drawn from voluntary army for training 150,000 men annually in compulsory training units	20,000
6. A first reserve to replace war wastage ...	30,000
Total voluntarily enlisted for General Service, peace or war	433,000

Category B.

In this Category are those forces which men voluntarily undertake to fill if a supreme crisis arises during a long war, when it has become evident that the Expeditionary Force will not suffice, such as in a war against Germany, with France as

our ally, the defence of Canada, the defence of India against Russia. For the forces in this Category we rely upon obtaining volunteers from the compulsorily-trained army, and, failing volunteers, then Parliament would be asked to give compulsory powers.

The numbers required are :

1. To supply new units to raise the strength of the Expeditionary Force	50,000
2. To replace war wastage	100,000
<hr/>	
Total voluntarily enlisted for war in a supreme crisis, but drawn from the com- pulsorily trained army	150,000
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Category C.

Next we come to the compulsorily trained home defence army, which it was stated at the beginning of this essay must have a strength of 1,000,000 men, out of which it supplies the 150,000 in Category B. It is conceivable that it might be necessary in a supreme crisis to ask Parliament to order this army to supply more than the 150,000 referred to in Category B.

Category D.

In this Category we take note of the forces of the Dominions, whose numbers, terms of enlistment, and training, are settled by the respective Dominion Governments, until such time as an Imperial Parliament may be created in which the Dominions are represented.

It is, however, assumed, that the Dominions will provide themselves with such forces as will render them safe until reinforced from other portions of the Empire, and that they will be willing, when the need arises, to place 50,000 men alongside our Expeditionary Force. In the case of war with the United States, Canada may be expected to add a further 100,000 to this last figure.

This completes the statement of Forces required, and the first question to be answered is "how to provide the 433,000 men required in Category A."

PROVISION OF CATEGORY A.

The first thing to decide is the period of enlistment, and the proportions between colour and reserve service.

Under our new scheme what number of men in Category A do we require to have with the Colours?

We know (see Item 15, "Recapitulation of Facts and Principles") that a unit, after sending to the depôt its unfit and immature soldiers, requires to draw 50 per cent. of its war

strength from the reserve. Consequently the Expeditionary Force of 200,000 is made up on the outbreak of war of 20,000, always at war strength, ready mobilized, 90,000 with the Colours but not mobilized, and 90,000 drawn from the reserve. The 118,000 in garrisons abroad are of course with the Colours in peace, also the 50,000 unfit and immature soldiers, also the 15,000 which are the nucleus of home fortress garrisons, and the 20,000 N.C.O.'s training compulsorily enlisted recruits.

Therefore total with Colours in peace

$$= 20,000 + 90,000 + 118,000 + 15,000 + 50,000 +$$

$$20,000 = 313,000$$

Total with reserve in peace

$$= 90,000 + 30,000 = 120,000$$

$$433,000$$

Of the foregoing numbers with the Colours 195,000 are at home, and, though of these only 90,000 are required to form the home link units which supply those abroad, still, as has been already shown, this does not govern the numbers with the Colours at home, which are determined by the size of the Expeditionary Force.

With 175,000 men with the Colours at home (excluding N.C.O.'s serving with compulsory army) there will be no difficulty in keeping 20,000 on a war footing, ready to undertake at 48 hours' notice a small expedition, or to act as a first reinforcement prior to the outbreak of war.

Having arrived at the above proportions between numbers with Colours and numbers in reserve, we can deduce the correct proportion between colour and reserve service in the period of enlistment.

With our Regular Army of to-day 35,000 recruits per annum mostly enlisting for seven years with Colours and five years in reserve, normally produce a force of 350,000 men, of whom 242,000 are with the Colours and 108,000 in reserve (see Item 4, "Recapitulation of Facts and Principles"), therefore, proportion in existing army between men with Colours and men with reserve is, normally, approximately as 24:11, whereas in Category A of proposed scheme, the proportion is approximately as 31:12, that is to say a larger proportion are to be with the Colours in the new scheme; consequently, while adhering to the approved period of twelve years' enlistment, it will be necessary to vary the proportion between Colour and reserve service, and make it eight and four years respectively.

Our rule of thumb (see Item 4, "Recapitulation of Facts and Principles") gives us that we require 43,300 recruits per annum to secure the total number in Category A, which is 433,000 men. This means that that inelastic figure 38,000 has to be increased by 5,300, but we may reckon on obtaining some

of the 10,000 recruits who annually enlist in the Special Reserve. Since it is proposed to abolish the Special Reserve, we should be allowed to count on some at least of its recruits joining the Regular Army.

To raise the average number of recruits enlisting annually in the Regular Army to 43,300, I rely upon two measures, apart from the gaining of recruits at present obtained by the Special Reserve.

Firstly and principally, I rely upon the fact that, behind the Regular Army, we are going to have a compulsorily trained Home Defence Army, and I have already stated that I accept the cogent arguments of those eminent men who say that this fact will stimulate voluntary enlistment in the Regular Army.

Secondly, I propose to make the career of the non-commissioned officer, particularly from sergeant upwards, a really satisfactory profession for a man to adopt. If we can do that we shall tap more freely a class of men who at present do not join the service as readily as we should like. If it could be shown that a man who joins the service could confidently hope to rise rapidly to the position of a well-paid sergeant, and that he would serve most of his time in England, and eventually draw a pension, I think this would be an undoubted incentive to joining the army.

We probably should not attract a single additional recruit by raising the pay of the private soldier, who is already well paid, but set your bait for a large class of men whom at present we hardly touch, and then the numbers will increase.

To do this I propose, that the only avenue to non-commissioned rank above lance-corporal in the compulsorily trained army shall be through the voluntarily enlisted General Service Army. This will make promotion to non-commissioned rank in the voluntary army very rapid. Next, I propose that all N.C.O.'s of the rank of sergeant and upwards should draw a substantial addition of one shilling a day above the present rate of pay. When we come to the financial aspect of the whole scheme it will be seen that the sum of money involved by increasing sergeants' pay is not large, and trifling in comparison with expected results. Lastly, every encouragement would be given to sergeants to serve on to 20 years and earn a pension.

We have seen (see Item 17, "Recapitulation of Facts and Principles") how necessary it is to possess a reliable set of professional, expert, non-commissioned officers, and by making this profession more attractive by increased pay, and increased facility for earning a pension, together with a larger proportion of home service than under existing conditions, we should attract the right class of man, and increase the number of recruits.

I submit, therefore, that the foregoing measures will produce the 433,000 men required for Category A, that is to say :—

- (1) Abolition of Special Reserve will cause some of its men to enlist in regular army;
- (2) Stimulation of recruiting, due to compulsory universal training;
- (3) Increased rapidity of promotion to non-commissioned rank, due to the filling of cadres of compulsory training units entirely by N.C.O.'s from voluntary army;
- (4) Improved status of N.C.O.'s from sergeant upwards, due to additional 1s. per day pay, larger proportion of home service, and facility for earning pension.

According to this year's Army Estimates we have 380,000 regulars and 63,000 special reservists, total, 443,000. I do not think I can be considered unduly sanguine if I hope, by the measures advocated, to turn those figures into 433,000 regulars.

If, however, results do not come up to expectation, and the figures fall short by some thousands of the desired total, the system will not break down since the remedy would be found by arranging that the deficiency lay in the 30,000 reservists who replace the first war wastage. On the outbreak of war these numbers would certainly volunteer from the compulsorily trained population. Men who are trained will gladly volunteer in large numbers under the excitement of war to go straight to the front, though they naturally hesitate to bind themselves to twelve years of general service in peace or war. When we have powers of expansion behind the regular army, due to the existence of a trained population, we need not fear for the maintenance of the numbers of the Expeditionary Force.

It may be argued that we should take more advantage of the fact that men who will not undertake any peace soldiering will (especially when they have been compulsorily trained) readily bind themselves to go to the front anywhere on the outbreak of war.

To mobilize our Expeditionary Force we rely on 90,000 reservists, and we ask for 30,000 more reservists to replace the first wastage of war. "Why," it may be asked, "should these 120,000 reservists be passed through the voluntarily enlisted General Service Army? At the present moment we obtain 63,000 Special Reservists who agree to join the Expeditionary Force in war. "Why," again it may be asked, "should we not similarly rely on registering 120,000 of the compulsorily trained men as willing to undertake the war obligations now accepted by the special reservists? If that could be done we should require only 313,000 in the voluntarily enlisted army, all serving with the Colours, for the whole of a twelve-year enlistment period. Comparing this 313,000 with the number of regulars including reservists in this year's Army Estimates there is a reduction of 73,000, while the number of existing cadres would be increased. This reduction of numbers would mean money saved that can be applied to the forming of the Compulsory Army.

It is an attractive proposal, but, after giving it much thought, it seems to me that it must be rejected for the following reasons :—

Firstly, these 120,000 reservists are not the only men the Expeditionary Force may call for. In a long war of supreme importance the force may ask for the 150,000 shown in Category B. If the compulsorily trained army has supplied 120,000 volunteers on mobilization it will not be easy to find 150,000 more when the second call is made.

Secondly, in any scheme of compulsory training it is essential to adhere to the cardinal principle that, on the outbreak of war oversea only the voluntarily enlisted army takes the field, and that, not until it is evident that that force, and its own reserves, will not suffice, and that national disaster will result if they are not reinforced, should volunteers be called for from the compulsorily trained men.

Thirdly, the Expeditionary Force is the steel head of the lance, and should not be composed, to the extent of 50 per cent., of men who have received only the absolute minimum of training, while the procedure of calling for them to volunteer would delay the mobilization of the force.

This rejected alternative certainly has the merit of cheapness, and of certainty in the supply of the reduced number of recruits required in peace for the Voluntary Army, so, if the nation refuses to pay the money for the whole scheme which I am recommending, then the alternative gives the nation the option of supplying men compulsorily, instead of money, to obtain volunteers. It exemplifies well how elastic, and expandible our whole system becomes the moment we decide to train the whole of the nation's manhood.

I trust that it is now agreed that I have shown how the forces in Category A, totalling 433,000, can be provided. As regards their organization and distribution—

There are to be 118,000 men abroad, in units of the various arms and departments at war establishment, and distributed among our possessions (Dominions excluded) in accordance with the strategy of the General Staff.

There are to be 20,000 men with the Colours at home, in units of the various arms and departments at war establishment ready to embark within forty-eight hours, to undertake a small expedition, or to supply a reinforcement prior to the outbreak of war.

There are to be 15,000 men forming the nuclei of the garrisons of home fortresses. War may break out suddenly. Raiding cruisers or fleets may attack a fortress within a few hours of the first danger signal, or even before it, consequently some posts in a fortress must never be unguarded, likewise some very skilled and highly trained men are required for some fortress duties. It is for these purposes that these 15,000 regulars must be maintained.

Additional to the foregoing there are to be 140,000 men with the Colours at home, in units of the various arms and departments as laid down by the General Staff on a peace establishment which is so calculated that, when stripped of their unfit and immature soldiers (50,000), they can be brought up to war strength by (90,000) reservists.

Of these 140,000 with the Colours at home about 90,000 form link units which supply drafts to the units abroad, and their peace establishment is the same as that laid down for the existing army; 6,500 are Guards battalions; about 10,000 are *dépôt* and other staffs and miscellaneous, leaving about 32,500 forming units which are not link units sending drafts abroad, but which exist because they are required for the Expeditionary Force, which has to be increased to 200,000. Since they are not draft supplying units their unit peace establishment would be 25 per cent. less than that of home draft supplying units. They are of course organized as double link units like the others, but with both their links at home, and take their turn on the Roster to change from this status to that of units which have one link abroad and one at home. When their turn for this change comes their establishment is expanded in the usual way.

There are to be 120,000 in the Reserve, of which 90,000 join the Colours on mobilization, and 30,000 remain available to replace wastage.

COMPARISON OF PROPOSED CATEGORY A WITH EXISTING REGULAR ARMY.

This concludes the peace distribution of forces in Category A, and, before passing on to Categories B and C, it is important to note the principal points of difference between this organization of Category A and that of the existing Regular Army when it attains its normal size in 1913, *viz.*: 350,000 regulars and 63,000 Special Reservists. In the latter army there are about 117,000 abroad, and it is proposed practically to adhere to this number, though the basis of this essay shows alteration in distribution, since it is assumed that South Africa will provide its own forces, and that the bulk of the existing South African garrison will move to Egypt.

There are about 125,000 with the Colours at home, of which about 90,000 are in link units supplying those abroad, and these link units and the Guards are the only ones available to supply cadres for the Expeditionary Force. The remaining 35,000 are composed of Guards, fortress troops, *dépôts*, etc.

There will be 108,000 reservists in 1913 and 63,000 Special Reservists.

Reviewing these numbers we find that the Expeditionary Force at the most optimistic estimate cannot exceed 160,000 men, and is more probably 150,000, of which about 30,000 have received only Special Reserve training. About 10,000 must be allowed for *dépôt* and other staffs, and miscellaneous.

Since only the Territorials exist to complete fortress garrisons, and to supply a home field force, at least 50,000 regulars must be joined with the Territorials in these duties. We then have only 41,000 to replace war wastage, of whom about 35,000 are unfit or immature soldiers, and nothing behind them in the way of thoroughly trained units, or even individuals.

The cadres of units of Expeditionary Force, and more so of troops left at home, must be made up very largely of untrained officers and N.C.O.'s.

The important points to note in the conditions of the existing army are firstly that to replace war wastage there are only about 6,000 men, excluding unfit and immature soldiers, and excluding the 50,000 which must remain in the country, while behind these are only volunteers from the untrained Territorials; secondly, that there are not sufficient cadres of trained officers and N.C.O.'s to form the units of an Expeditionary Force of 200,000, which is the irreducible minimum; thirdly, trained officers and N.C.O.'s are not forthcoming for the Territorial Army.

In comparison with this the scheme I have outlined provides trained professional officers and N.C.O.'s for an Expeditionary Force of 200,000 men, since it is proposed to increase the existing number of units.

The proposed scheme also provides 30,000 trained reservists to replace the first war wastage, and, more important still, it has behind it the mass of trained men in Categories B and C, formed, as I am about to show, into an organized army of fighting units, led by trained officers and N.C.O.'s.

As to how these officers are to be found that question will be dealt with after the organization of Categories B and C has been described.

COMPULSORILY TRAINED ARMY FOR CATEGORIES B AND C.

We now pass to the organization of a compulsorily trained army.

With regard to the numbers available, the National Service League statistics, based on the 1901 census, are, I believe, accepted. They are:—

Number of lads reaching the age of 18 in any one year in United Kingdom according to 1901 census	...	...	...	...	...	416,000
Deduct 48 per cent. for medical and legal exemptions	...	...	...	...	...	200,000
Deduct Recruits for Navy and Marines	...	...	...	...	...	8,000
Deduct Recruits for Regular Army	...	...	...	...	...	35,000
Deduct Emigrants	...	...	...	...	...	10,000
Deduct Mercantile Marine	...	...	...	...	...	15,000
Total deductions	...	...	...	...	...	268,000

leaving to be trained each year 148,000, or, say, 150,000.

I have proposed to increase above figure of recruits for Regular Army from 35,000 to 43,000, but the population has increased since 1901, so that we may safely assume the figure 150,000 as the number to be trained each year.

In the first portion of this essay I gave the arguments, and summarized them in Items 19 to 25 of "Recapitulation of Facts and Principles," which lead me to select one year as the period of compulsory training. I would also suggest that there should be no refresher courses, and no further calls on the men during peace. It is argued that patterns of rifles and guns change, that drill and manœuvres change, that a man loses skill in riding, but it must be remembered that the compulsorily enlisted army is not going to meet the enemy until all the forces in Category A have taken the field, and that a man who has received one year's sound training under professional officers and N.C.O.'s will not require more than a week or two to master any changes that have occurred since he was in the ranks, or to get into physical training again.

I think I have already proved that the removal of 150,000 youngsters per annum will have no prejudicial effect upon commerce, but I agree that subsequent calls upon the men during peace will dislocate business seriously, even though those calls be only for short periods. If opinion is against me on this matter of refresher courses, then at least it should be stipulated that they should on no account exceed in duration one week per annum.

In order not to interfere with the recruiting of the Regular Army, the men would be liable to come up for training at 19, but I should permit a man to postpone his training till he is 20, if he can show good reasons for doing so.

We do not wish to keep the liability for war service hanging over a man a moment longer than is necessary. We require 1,000,000 men, including those actually undergoing training. With an annual contingent of 150,000, and allowing for wastage, we shall have 1,000,000 trained men after eight years. Consequently a man will be called up at 19, or in special cases at 20, and receive one year's training in a training unit. He then remains liable to recall to the Colours in time of war until his twenty-seventh birthday, or till his twenty-eighth birthday if he postponed his training one year.

As regards pay, we are not under the obligation to attract men by the pay as we are in the case of the voluntarily enlisted army. We must give the men everything necessary to keep them in first class physical condition, but there is no necessity for us to provide them with pocket money to purchase luxuries. Money for an increased army will be hard to obtain, and it would be folly to spend any that is not imperatively demanded. Consequently I propose that the pay of the compulsorily enlisted soldier, while he is undergoing training, shall be one penny per diem, but, when called up for war service, his pay shall

be the same as that of the voluntarily enlisted soldier. Only a very small proportion of men are married at the early age of 19. In such cases separation allowances would have to be paid to the family during the year of compulsory training.

As regards clothing, only field service clothing need be issued. Expensive full dress, which attracts recruits to the voluntary army, is not required for those who are compulsorily enlisted.

Now as to the training units. They are not to be dépôts in which a man is taught squad drill and manual exercise. He is to be trained as a soldier of a moving, fighting unit. Moreover, on the outbreak of war, cadres have to be provided to absorb the numbers recalled to the Colours, and to convert them from a mob into an organized army. During war the training of the youngsters must also continue uninterruptedly.

Consequently, to train the rank and file in peace, and to lead them in war, we have to possess the cadres of organized units, which can multiply themselves on the outbreak of war, and, to ensure that the amount of multiplication is not beyond the power of these cadres we must have as many of them as possible existing in peace. It has been demonstrated that, if the establishment of a unit is reduced below a certain figure, then the training of all ranks becomes impossible. We must therefore arrive at this minimum. It has been found in practice that units which have to supply drafts to units abroad require a minimum establishment, excluding offices, of infantry 800 per battalion, cavalry 700 per regiment, battery 150, but the compulsory training units which we are now considering do not have to supply drafts for abroad, so their establishment may be reduced to 600 per battalion, 530 per cavalry regiment and 110 per battery, while engineer and departmental units would have a proportional establishment.

The first thing then to be done is for the General Staff to divide the annual contingent of 150,000 youngsters into units of the foregoing establishments, and in the proper proportion of the various arms and departments.

The next thing to do, is to provide each unit with a full war establishment of regular officers, and regular N.C.O.'s of the rank of full corporal and upwards. For this purpose we may say that 6,000 officers and 20,000 N.C.O.'s are required.

On the outbreak of war the proportion of rank and file in a war strength unit, as compared with a peace strength unit, would be approximately as 5 : 3, consequently the total strength of the units, when raised to war establishment, would be 250,000, which would mean that they had absorbed 100,000 of the men recalled to the Colours.

Out of the 1,000,000 men available it is proposed to have 750,000 in organized units, and 250,000 in reserve to replace wastage. Therefore it is evident, that to hold the 750,000 men

with the Colours there must be three times as many cadres in war as there are in peace.

How is this to be done?

We now see the importance of having all the peace cadres composed of regular officers and N.C.O.'s. On the outbreak of war, each of these peace cadres breaks up into three portions, and each portion makes itself up into a war cadre by calling up the necessary number of reserve officers and N.C.O.'s, the provision of whom will be presently explained.

Thus in war the proportion of reserve officers and N.C.O.'s to regular ditto will be as 2:1, but of course the reserve officers will be in the junior ranks of subaltern and captain, and the regulars will hold such posts as adjutant and quartermaster. Hence number of reserve officers required for mobilization is 12,000, and reserve N.C.O.'s 40,000.

Each peace training unit thus becomes on mobilization three war units at full war strength, with one third of their officers and N.C.O.'s professional experts, and the other two-thirds by no means far below them in attainments, as I shall presently show.

Of course the regular officers in an infantry battalion take the posts of commanding officer, second and third in command, adjutant, quartermaster and four company commanders. The other company commanders and the subalterns are supplied by reserve officers. In the other arms and departments the regular officers would hold the corresponding important posts.

Each training unit would be affiliated to one of the double link units of the Voluntary Service Army. It would be, in fact, the third battalion of an infantry regiment, and the regular officers and N.C.O.'s of that regiment would pass backwards and forwards between the three battalions, in the same way as they now do between two battalions of a regiment. They would thus be in every way thoroughly trained and experienced officers and N.C.O.'s, with the varied training obtained all over the world, that is customary in the British Service.

Of course, the foregoing arrangements for the training of the compulsorily enlisted army involve the provision of barracks.

There is undoubtedly a great popular prejudice against compulsorily enlisted recruits living in barracks; and, from the point of view of expense, one would gladly avoid it if one could, but how can it possibly be avoided? And, except on the ground of expense, which is of great importance, is there any other reason why the men undergoing training should not be housed in barracks? Is not the prejudice quite unreasonable? Does it not date back to a time when barracks were not the well-managed and healthy habitations they now are, and when soldiering was not so strenuous, so that Satan found mischief for idle hands to do?

We shall enlist all classes of the nation, and they can make the standard of life in barracks the same as they make it outside. One has to recognize the existence of this prejudice, and to give reasons for not being able to concede to it. The reasons are that no other plan is practicable. The training must go on throughout the year; the more the men are in camp the better, but for at least six months of the year, they must be under the shelter of bricks and mortar. Some suggest they should make their own arrangements for living in the towns. This means that the training centres, which should become concentration centres in time of war, will not be selected for their strategic situation within striking distance of the South and East coasts, or near fortresses which require garrisons, but they will be placed near towns where lodging accommodation is available. The Government, of course, must pay for these lodgings. Is that going to be cheaper than barracks? How is the price of these lodgings to be kept down, when the landlords know that the Government must have them? When epidemics of disease visit these towns, how is the health of the men under training to be safeguarded? Why should so much of the men's time be wasted in walking to and from their lodgings? There is no time to waste when there is only a year in which to make a cavalryman, or artilleryman, or even an infantryman. The men would lose one of the essential portions of a soldier's training, the comradeship, the working together, the give and take, and the habits of discipline, so essential in army life.

The advocates of the lodging house want to avoid discipline, but discipline is one of the prime necessities of military training.

No single other nation is able to carry out a whole year's training without housing the men in barracks. Why, therefore, should we expect to do so?

Much as we should like to avoid the expense of new barracks, there is no escaping the fact that, when we decide to compulsorily train 150,000 men annually for one year, we must provide barracks for them.

Any new scheme involves a certain amount of initial non-recurring expenditure. When the Territorial Army was started this matter of new capital expenditure was kept in the background, and provision for it was very sparingly made, with the result that it has been forcing itself into the foreground ever since, and has hampered the working of the scheme.

In peace time, then, we shall have 150,000 compulsorily enlisted recruits, training in units of the proper proportion of the different arms and departments, these units having a full war cadre, but a reduced establishment of rank and file, thereby maintaining the maximum number of cadres.

On mobilization we shall have 750,000 men in three times as many units as existed in peace, all units at war strength,

composing an organized army ready to move and fight.

One third of these units would go steadily on with the training of the recruits of the year, and of those recalled to the Colours of that unit to make it up to war strength.

Behind these 750,000 mobilized men there are to be 250,000 trained men waiting to be called up to replace wastage.

Here, then, we have the organized army of 1,000,000 trained men, which is to supply the forces shown in Categories B & C, and whose duties are laid down in paragraph 3 of the statement of the Empire's military liabilities, which is given near the commencement of this essay.

To obtain this force what are the sacrifices demanded from individuals, and from the commercial community? The individual puts in one year's training at the age of 19, or at the age of 20. He is then a free man, unless a very serious war breaks out which threatens disaster to his country and to himself. For ordinary oversea wars of even considerable size, such as the defence of Egypt, he is not disturbed, unless he chooses to volunteer for them, since a voluntary Expeditionary Force of 200,000 men will exist, and behind them a voluntary reserve of 30,000. These can deal with all but the most serious contingencies. Up to his twenty-fifth birthday he is liable to recall to the Colours in a national crisis. Between his twenty-fifth and his twenty-seventh birthdays he belongs to the reserve of 250,000 men who are to replace wastage, and who are only called up as, and when, they are required. After his twenty-seventh birthday he is free of all liability to serve.

As to the commercial community, in peace time 150,000 youngsters are withdrawn from the huge population from which they select their office boys, their apprentice artisans, their unskilled labourers, the learners in every walk of life, but plenty of young men of 20 and upwards are left to fill the unimportant posts which youngsters of 19 occupy in the commercial world. At the end of the year these 150,000 return to their occupations, better men in every way, and more fitted to take up the work of the 150,000 whose turn it now is to be trained.

If war breaks out on such a scale as to threaten national disaster, it is to the interest of commerce to terminate the war as soon as possible, consequently the more mighty and efficient the war machine the sooner will commerce resume its peaceful progress.

Commerce also gains in the prevention of many wars which would be forced upon a weak nation, whereas a strong nation's peace is not lightly challenged.

Consequently we may say that, in place of being asked for sacrifices, the commercial community would benefit enormously by the scheme advocated.

SUPPLY OF OFFICERS.

I have reserved till now the solution of the problem concerning the supply of officers for the forces in Categories A, B and C.

The officers may be divided into two classes. Firstly, the "regular" officers, who serve continuously in peace or war, at home or abroad; and secondly, the reserve officers, who are only called to the Colours in the event of a general mobilization, and who obtain such training in peace as their ordinary avocations will permit.

I propose to deal with these classes separately.

Beginning with the regular officers, we have of these, according to this year's Army Estimates, about 13,000, of whom about 1,300 are employed with the Special Reserve and the Territorials, so that the latter become available to reduce the increase that my new proposals necessitate.

The proposed scheme increases the Expeditionary Force by approximately 50,000 men. For these about 2,000 regular officers will be required. I have also shown that 6,000 regular officers are required for the compulsory training units, total 8,000, less 1,300 available from the abolished Special Reserve and Territorials, leaving 6,700 additional regular officers to be provided. This is an increase on existing numbers by approximately 50 per cent.

In view of the recent alarming symptoms as to shortage in supply of officers how are we going to obtain the increased number required?

In the first place, as in the case of N.C.O.'s and men, the institution of universal military training will undoubtedly increase the number of men desirous of obtaining an officer's commission. I would propose that the ordinary channel to a commission should *not* be through the universal training ranks, but that we should continue to obtain, and train, our officers as at present, *viz.*, entry by competitive examination into cadet colleges, and that we should follow the naval principle of "catch 'em young," the younger the better, and let them have their commissions before they are nineteen. If they could enter the cadet colleges before they are sixteen, and receive a three years' education there for a maximum annual fee of fifty pounds, large numbers of parents would gladly seize this opportunity to give their sons a sound, cheap education, and would be tempted by the prospect of having them off their hands at nineteen, as I am going to make proposals which should render an officer independent of allowances from his parents.

But these cadet colleges should not be the only sources of supply. We must get into our net those men who, having done one year's compulsory training, are fired with the ambition to become regular officers. Subject to the necessary certificates of behaviour and efficiency during their period of compulsory training, let them pass a competitive examination

of suitable standard, and then proceed to a cadet college for a special curriculum lasting one year, after which they would join the Army with seniority just below those of their own age who passed through the whole course at the college.

Also, let there be a one year class at the cadet colleges formed of N.C.O.'s selected from the voluntarily enlisted army, who, in everything but education, have shown themselves fitted for commissions, so that opportunities may be given to the voluntarily enlisting recruit to rise to the highest grades, by obtaining the opportunity to make up to a great extent for previous lack of education.

Finally, we must cast our net at the Universities, and offer commissions there under the conditions at present authorized.

But the success of all these measures depends upon one important condition which is lacking in our Army of to-day. The officer must receive a living wage. He must be independent of private income. Recently the public has been well educated in the financial embarrassments of the subalterns. When one has to educate the public one must supply them with small, and simple, doses of information; they cannot assimilate large and varied doses. Hence those who have been championing this cause have confined themselves to the task of getting into the heads of the public how miserably paid is the subaltern. But the regimental captain, major, and lieutenant-colonel are equally, or even more hard put to it to live on their pay.

A profession where the emoluments are such that it is impossible for a man to marry is certain to be shunned by a large number of men, who would otherwise be very glad to enter it, and who would be in every way suitable.

When one sees the source of supply drying up one must search for new sources, and attract the largest possible number of men.

The condition of the married captain, the major educating children, the lieutenant-colonel giving his children a start in the world, is every bit as desperate as that of the subaltern, when they are dependent only on their pay. Consequently, any relief given must be given from lieutenant-colonel downwards to officers not employed upon the staff, which is sufficiently well paid. The amount given must ensure that from the very commencement of an officer's career he is independent of private income.

The officers of engineers, and departments with special rates of pay, are not in such urgent need of relief as the officers of the regimental units, but any increase to the latter must be accompanied by some, though a smaller increase, to the former, otherwise a great deal of the attraction to these very important branches of the Army will vanish, and the efficiency of the whole Army will suffer considerably.

A suggestion which seems very popular in some quarters would find money for the subalterns by taking it away from the generals. When it was proposed to pay Members of Parliament I do not remember any Member of the House sug-

gesting that the money could be found by reducing the salaries of Cabinet Ministers. The would-be despoilers of generals imagine they are proposing a scheme which will attract more men to become officers. They insult the Army by insinuating that the generals are not worth their pay, that it is a profession in which mediocre and valueless men can rise to high positions. The officers of the Army respect their generals, and consider them well worth their pay; they consider their profession one which ranks possibly above others, and they consider that to rise in it, qualities are required which are as rare as those necessary for success in other professions.

Take away from the officers of the Army this respect for their profession, persuade them that it is not worth the attention of an able man, that its leaders are valueless men who should receive a very small remuneration, and it will not be long before the shrinking sources of supply will disappear altogether. There are subalterns who cherish the preposterous idea that they will some day be generals, and they will not thank you for giving them to-day what you propose to take back in the future.

I would suggest that the pay of generals, and full colonels, and all staff officers, remain as at present, and that the pay of all regimental officers from lieut.-colonel downwards be increased by £100 per annum per officer, while engineer and departmental officers, from lieut.-colonel downwards, should receive an increase of £50 per annum each.

The total sum involved by these increases to those of the existing 13,000 officers who would be entitled to it is only about £500,000.

These proposals would start the subaltern on a living wage independent of private means, and would make a substantial increase to the pay of all those officers who so badly need it.

No parent need hesitate to enter his son for a profession which draws these rates of pay, and any class of man may hope to hold a commission if he can educate himself to qualify for it. With early entry to a cadet college at sixteen, the provision of a sound, cheap education up to nineteen, the earning of a good salary at nineteen, and adequate pay through all ranks, with commissions offered both to the compulsorily and voluntarily enlisted recruits who qualify for them, with these offers I submit we should attract the 19,700, say 20,000, regular officers required for the whole of the forces proposed in the scheme under consideration.

Now as to the reserve officers:

On mobilization, 12,000 officers are required to fill the cadres of the compulsorily enlisted Army, since the number of units existing in peace are multiplied by three on the outbreak of war. In addition to this there should be at least 1,000 more to allow for the numerous extra posts that have to be filled, and to replace war wastage. The total number of reserve officers required is, therefore, 13,000. They are required in

the junior ranks only, *vis.*, subaltern and captain. Vacancies in the ranks of field officers can always be filled by promoting regular officers.

Reserve subalterns should not be older than 32 years of age, and reserve captains not older than 40 years of age. It is quite evident that the existing reserve of officers does not meet the above requirements, either in numbers, or in qualifications.

Those officers (principally field officers), who have retired because, for various reasons, they no longer care to remain in the Service, must be employed, when they rejoin, in a fairly senior capacity. They do not supply the great demand for subalterns and captains, and, with the best will in the world to serve their country, they are, to say the least of it, somewhat rusty. They find that their contemporaries, and men who were formerly their juniors, are holding the high commands, and they are not as young as they were in the execution of subordinate duties. During the South African War they were irreverently known as "dug outs."

Recently arrangements have been made, especially in engineer and departmental corps, to induce young civilians to undergo a certain amount of training, and to undertake the liability to serve as officers in war. It is this principle which must be followed, and which becomes so easy to develop to almost any extent the moment that we obtain universal military training.

It stands to reason that, if a man knows that he must return to the Colours on the outbreak of war, he will infinitely prefer to return as an officer rather than as a private. Consequently, there will be a large number of men who are in every way fitted to become officers, and who have received the grounding of military education during their compulsory training in the ranks, and who will be able, and willing, to devote a certain amount of time to qualifying as officers. They should be required to pass the same examinations for promotion as regular officers pass, and they should be compelled to do at least one fortnight's training per annum, when they would take up their positions as captains and subalterns, and learn to command. While doing duty they would be paid at the same rate as the regular officer, and they should be encouraged to spend as much time as they can spare with the Colours learning their work.

Such men would make valuable officers, and a cadre composed of two-thirds of these men and one-third regular officers could be relied on to lead a unit in war successfully.

The same principles would apply to the reserve N.C.O.'s, of whom about 40,000 are required. These men would be selected for their efficiency at the end of their one year of compulsory training, and, if they volunteered to register as reserve N.C.O.'s, would be required to do one week's training as such per annum.

By these measures we obtain the efficient cadres which are the framework, and the essentials, of an efficient Army. Again I would emphasize the point that an army cannot be created by simply giving military training to a number of individuals. It is essential to have trained expert cadres in the proper proportion of the various arms and departments of an army, ready, on mobilization, to absorb into the organized units of an army the mass of trained individuals. Without these organized cadres, however individually highly trained the manhood of the nation may be, they remain a mob and not an army.

CATEGORY D.

We now turn to Category D, which contains the forces of the Dominions. These will not detain us long, since it is not our business to legislate for them. Each self-governing unit of the Empire must decide for itself what numbers of men it will maintain, and train, and by what methods it will enlist and train them. It is for us to take note of the result, and to work it into the scheme of Imperial defence. We note that Australia, New Zealand, and South Africa adopt universal training, that Canada still adheres to voluntary enlistment, but is undertaking a considerable reorganization of her forces after obtaining the advice of our Inspector-General, and we are justified in assuming that each Dominion will make itself safe against anything but the most serious invasion, that, in fact, they can all hold out against any force which is likely to be brought against them until the other parts of the Empire can go to their assistance.

Looking back to the time of the South African War, remembering the valuable efforts made by the Dominions during that war, and the spirit which animated them, and taking note of the great, and continually increasing, expansion in the population and resources of the Dominions, are we not justified in expecting to find them offering to place 50,000 men alongside our Expeditionary Force within three months of the outbreak of war, and to maintain that number throughout the war?

But, though there must be no interference in the internal administration of the Dominion Armies, there is no reason why we should not all help each other to arrive at the best pattern of an army, and endeavour to arrive at uniformity in armament, equipment, organization, administration, and training.

I would recommend the formation of an Imperial Army Committee composed of three officers from each Army, taking their instructions from their respective War Offices, but meeting for a long period every year, and corresponding during the interval, to discuss the matters in which the various Armies follow different methods, and to endeavour to agree upon the most satisfactory solution in order to obtain uniformity. Their

recommendations would carry weight in the respective War Offices, where the responsibility for action thereon would remain, and, in time, there can be little doubt that uniformity would result.

ESTIMATE OF COST.

In Appendix I., I have summarized the main principles of the scheme which I have proposed, and in Appendix II., I have worked out estimates of the cost of the annual maintenance of the proposed forces. I have not given an estimate of the initial capital and non-recurring expenditure required to establish the new forces, since to arrive at even an approximate figure, very exhaustive enquiries, and estimates would be necessary, the information for which is not at my disposal. There is, however, no doubt that this figure of initial non-recurring expenditure would be a large one. How could it be otherwise? In place of an existing Army of 380,000 regulars, supported by 63,000 under-officered and half-trained Special Reservists, and 270,000 under-officered and untrained Territorials, we now propose to have an Army of 1,500,000 well-officered and well-trained men. We are going to double the numbers, and quadruple the efficiency. No enterprise or business can expect to make such an expansion without a considerable outlay on capital expenditure. It is evident that barracks must be built for the 150,000 men annually trained compulsorily, and barracks will be required for the 50,000 additional regulars.

One naturally shrinks from facing this question of initial expenditure, but, when we are trying to escape from these figures, let us bear in mind the remarks at the beginning of this essay. What are our enemies doing? Have they made it absolutely necessary for us to possess these forces in order to preserve our national existence? If so, what is to be gained by refusing to face this initial and non-recurring expenditure? We gain a temporary respite, how short no man can prophesy, and then ruin is forced upon us, accompanied by those horrors of war which a beaten nation has to endure.

Although I have not attempted to estimate the initial capital expenditure, I have, in Appendix II., gone very carefully into the probable cost of the annual upkeep of the proposed forces. My method has been to examine every sub-heading of the Army Estimates for 1911-12, and to ascertain what increase, or decrease, would result from my proposals. In doing this I have recorded the results on two separate Tables.

Table A gives the increase due to those proposals of mine which affect the voluntarily enlisted Regular Army, and Table B gives the cost of the compulsorily trained Army. In round numbers the increase on the existing Army Estimates of 1911-12 is, for the Regular Army, five and three-quarter millions, and

for the compulsory Army six and a quarter millions; total 12 millions.

Of the five and three-quarter millions, about half a million is for measures to obtain a supply of officers, and this half a million is inevitable, even if no other alteration is made to our existing Army, so that really the increase due to my proposals should be reduced by that amount.

The bulk of the increase in expenditure on the voluntarily enlisted Army is due to the addition of 50,000 men to the Expeditionary Force. This means that the nation is asked to pay that sum for increasing the size of the buffer which stands between it and personal service. If the Expeditionary Force is not large enough for its weight to tell promptly, and decisively, when thrown into the scales which are balancing the Powers in Europe, then the war drags on, and the necessity for calling upon the compulsorily trained Army will arise.

CONCLUSION.

My purpose in showing how the increased expenditure is distributed between the voluntary and compulsory Armies respectively is to distinguish that expenditure which is absolutely necessary for national existence, and to avert certain ruin, from that which is highly desirable in order not to dislocate the ordinary life of the nation, and to allow it to pursue unchecked its career of commercial prosperity.

The compulsory Army we must have, at the ridiculously cheap figure of six and a quarter millions. On the day that we possess that army as the complement of a two-Power standard Navy, we are as safe from national disaster as human measures can make us, but if the nation wishes to enjoy that peace which is secured by our enemies knowing of our power to strike, and if it wishes to ensure a speedy termination of any war upon which we embark, and further, what is more important still, if it wishes to postpone as long as possible the dislocation of its everyday business which will be occasioned by the call upon the compulsory Army for war service, then it will also spend the additional five and three-quarter millions which is required to make effective the buffer which, in the shape of the voluntary Army, exists between the compulsory Army and the contingency of personal war service.

Which is the truest economy? To spend 27½ millions per annum upon a weapon which we know must break in the nation's hand in a life and death struggle, and the known weakness of which is a standing temptation to our enemies to force war upon us? Or, on the other hand, to spend 39½ millions per annum upon a weapon which will certainly preserve us, and the known strength of which will ensure the peace which the Empire desires? We have recently added 12 millions per annum to our expenditure for old age pensions; we are going to add 25 millions for insurance against sickness and unemploy-

ment; is not insurance against national disaster for an additional 12 millions per annum as urgent as the foregoing measures?

Again I would urge that attention must not be entirely focused on these formidable figures of expenditure. Cast your eyes round the world and survey the preparations of possible enemies, examine the formidable list of the Empire's military liabilities given in this essay, consider what a precious heritage we have to guard and to hand on to the next generation, then bring your eyes back to these figures of expenditure, and accept them as the truest economy.

APPENDIX I.

SUMMARY OF PROPOSALS.

1. There should be a voluntarily enlisted army for general service in peace or war at home or abroad.

2. In place of the existing Special Reserve and Territorial Army, there should be an Army formed by the compulsory training of the whole manhood of the nation with certain necessary exceptions such as men for the Navy and Mercantile Marine, and for the Voluntary Army, etc.

This compulsorily enlisted Army is for home defence, and a reserve from which men may be expected to volunteer for war service with the Voluntary Army.

In the last resort in a grave national crisis it would be possible for Parliament to order the employment of the compulsory Army overseas.

3. The terms of enlistment of the Voluntary Army to be eight years with Colours and four in the reserve.

4. The strength of the Voluntary Army to be 433,000, distributed in peace as under:—

Overseas garrisons	118,000
In fortresses at home	15,000
Mobilized at home for immediate embarkation ...	20,000
With Colours at home and fit for war	90,000
Unfit and immature soldiers with Colours at home	50,000
N.C.O.'s doing duty with Compulsory Army ...	20,000
In Reserve	120,000
Total	433,000

5. In war the distribution of the Voluntary Army will be:—

Oversea Garrisons	118,000
Expeditionary Force	200,000
In Fortresses at Home	15,000
Unfit and immature soldiers at dépôts	50,000
N.C.O.'s doing duty with Compulsory Army ...	20,000
Reserve to replace wastage	30,000
Total	433,000

6. The existing system will be continued by which all training in peace is carried out in organized fighting units on a reduced peace establishment and not in depôts, and the Cardwell System of units abroad being fed by same number of units at home will be adhered to, but there will also be other units at home in numbers regulated by the size of the Expeditionary Force.

7. Increase of pay of regular officers doing regimental duty, from lieutenant-colonel downwards by £100 per annum, and increase of pay of engineer and departmental officers not on the staff by £50 per annum.

8. Reduction of fees paid by parents at military cadet colleges to £50 per annum. Entry into cadet colleges before the age of 16 for a three years' course, thus ensuring cheap, sound education, and early start in life on a living wage.

9. Pay of all N.C.O.'s of rank of sergeant and upwards to be raised by one shilling per diem.

10. All men of all classes who, at the age of 19, have not enlisted in Voluntary Army, or Navy, or Mercantile Marine, or who do not come under the head of those who are in all countries legally exempted on account of unfitness or other specified causes, shall undergo one year's training in a compulsory training unit. They may, if they give special reasons, be allowed to postpone this training for one year. The numbers are estimated at 150,000 per annum.

11. On completion of his one year's training every man reverts to civil life, but remains liable for seven years to recall to the Colours in case of war. In time of peace no calls upon him will be made for any further training.

12. The pay of the compulsorily enlisted men will be one penny per day, and field-service clothing only will be issued to them.

13. The foregoing conditions will provide 1,000,000 men in the Home Defence Army, who have had training and are liable to recall, or who are undergoing training.

14. The annual contingent of 150,000 men will be organized in training units, the establishment of rank and file in which will be approximately:—Infantry 600, cavalry 530, battery of artillery 110, engineer and departmental units proportional, thus giving the maximum number of cadres available for expansion in war, compatible with sound training of all ranks in peace.

15. Each training unit will have a full war establishment cadre of regular officers and N.C.O.'s from the Voluntary Army. The individuals of these cadres will transfer backwards and forwards between Voluntary Army and compulsory training units affiliated to their regiments, just as officers and N.C.O.'s now transfer between link units. There will be 6,000 regular officers and 20,000 regular N.C.O.'s with training units.

16. On mobilization the cadre of every training unit splits into three, and forms three separate cadres by calling up 12,000

reserve officers and 40,000 reserve N.C.O.'s. By this multiplication of the cadres by three, and by raising units from peace establishment to war strength, a total of 750,000 men are absorbed into organized units of the various arms and departments of an army, while 250,000 trained men remain in reserve to supply wastage.

17. The 12,000 reserve officers referred to in paragraph 16, plus another 1,000 for wastage, total 13,000, are selected from suitable persons who have undergone their compulsory training, and who volunteer to pass the examinations prescribed for regular officers, and to train for three weeks per annum, receiving pay while training. Their age must not exceed 32 years for subaltern, 40 for captain. None will have rank senior to captain during peace.

The 40,000 reserve N.C.O.'s are obtained by similar measures.

Men who are liable to recall to the Colours in war will prefer to rejoin as officers or N.C.O.'s, so that there should be no difficulty in obtaining the required number.

18. Volunteering from the compulsory to the voluntary Army would at all times be encouraged; and it is relied on to keep up the strength of the Expeditionary Force during a long war. It is possible that whole units might volunteer, and, in the event of a grave national crisis, it would be open to Parliament to consider the necessity of ordering units of the compulsory Army to reinforce the Expeditionary Force overseas.

19. Subject to deductions due to volunteering referred to in paragraph 18, the distribution of the compulsory Army on mobilization would be:—

Fortress garrisons at home	150,000
Local internal defence of United Kingdom ...	100,000
Field Force to defeat invaders	500,000
In Reserve to replace wastage and to replace	
Volunteers joining Expeditionary Force ...	250,000
	<hr/>
	1,000,000

The annual contingent of 150,000 undergoing training would form a portion of the forces told off to fortresses and internal defence.

20. The Dominions are entirely responsible for their own forces; but, judging from the measures they are taking, and from past experience, we can rely upon them ensuring their own defence until help can reach them, and also we may hope to see them providing and maintaining 50,000 men, to augment the Expeditionary Force within three months of outbreak of war.

21. An Imperial Army Committee should be formed, to serve on which each Dominion, and the United Kingdom,

would nominate three officers. The functions of this Committee would not be executive, but consultative and advisory, and their object would be to gradually obtain uniformity in the organization, training, and armament of the various forces of the Empire.

APPENDIX II.—ESTIMATES.

TABLE A.

Comparison with Army Estimates, 1911-12, showing effect of proposed alterations in Voluntarily Enlisted Army only.

See detail explanations appended.

Vote No.	Service	Increase on 1911-12 Estimate £	Decrease on 1911-12 Estimates £	Remarks.
1	Pay allowances, etc., etc., of 50,000 Warrant Officers, N.C.O.'s and men added to numbers with Colours at Home.	1,710,000		See attached explanatory remarks upon each Vote.
	Pay, allowances, etc., of 2,000 Officers for the increase of 50,000 men including proposed increase to rate of pay = $2,000 \times (190 + 85)$...	559,000		
	Increase of Pay to Regular Officers of existing Forces excluding India and excluding Regulars with Special Reserve and Territorials = £640,600 = $(£85 \times 900)$	564,100		
	Increase of Pay by 1s. per diem to Warrant Officers and N.C.O.'s from Sergeant upwards in existing forces excluding Special Reserve and Territorials and excluding India $19,027 \times 18\frac{1}{2}$	347,200		
	Decrease of 16,000 in Army Reserve	...	147,000	
2	Increase to Medical Vote due to increase of 50,000 men	112,000		
3	Decrease credited to compulsory army in Table B.			
4	Decrease credited to compulsory army in Table B.			
5	See details in explanations attached	36,000		
6	" " "	329,000		
7	" " "	959,000		
8	" " "	58,000		
9	" " "	405,000		
10	" " "	342,000		
11	" " "	7,300		
12	Nil.			
13	See details in explanations attached	301,000		
14	" " "	132,500		
	TOTALS	£5,853,100	£147,000	
	Net increase	£5,706,100		

EXPLANATION OF FIGURES IN TABLE A.

Vote 1.—(a) Since 176,641 Warrant Officers, N.C.O.'s and men (page 12, Army Estimates) draw £6,000,000 (abstracted from Army Estimates), the pay of the proposed increase of 50,000 N.C.O.'s and men to Regular Army at home may be taken as £1,710,000.

(b). There are about 5,316 regimental officers of cavalry, artillery and infantry (excluding India) who would be entitled to proposed increase of £100 per annum. Total drawn by these = £531,600. There are about 2,180 officers of engineers and departments who would be entitled to proposed increase of £50 per annum = £109,000. Therefore total increase to existing officers = £640,600, and average rate of increase = £85 per officer. About 900 of the foregoing officers are in Special Reserve and Territorial Force. The average pay, allowances, etc., per regimental officer, taking all such from lieutenant-colonel downwards, is £190. Hence pay, allowances, etc., of 2,000 \times (190 + 85) = 550,000. Increase of pay to existing regular officers, excluding those of Special Reserve and Territorial Force = £640,600 - (£85 + 900) = £564,100.

(c). There are 1,357 warrant officers and 17,670 sergeants, excluding 741 in Special Reserve, who would be entitled to proposed increase of 1s. per day = £347,200.

(d). 139,000 men in Army Reserve draw (Army Estimates, page 30) £1,294,000, therefore decrease of 16,000 Reservists gives a saving of £147,000.

Vote 2.—Pay of Medical Establishment of all ranks, from lieutenant-colonel downwards, and of Army Nursing Service, and of medicines, for 125,000 men at home, and 44,000 abroad, excluding India, totals £403,000, the increase due to medical service of the additional 50,000 Regulars at home may be taken as £112,000.

Votes 3 and 4.—See explanations to Table B.

Vote 5.—(a). Increase due to relieving parents of about 500 existing Cadets of £100 per annum Military College fees = £50,000.

(b). Increase of number of Cadets by 50 per cent. to supply increased number of officers adds to college fees paid by Government £25,000.

(c). For increase of officers and for increase of 50,000 men add $33\frac{1}{3}$ per cent. to sub-heads A. B. C. D. E. K. of Army Estimates = £61,000.

(d). Total increase to Vote 5 = 50,000 + 25,000 + 61,000 = £136,000; of this £100,000 may be taken as due to compul-

orarily enlisted army, and £36,000 due to voluntarily enlisted Regular Army.

Vote 6.—Provision is made for about 179,000 officers, N.C.O.'s and men at home and abroad excluding India; also for 63,000 Special Reservists, of whom about 10,000 are training for six months, and remainder for one month, which is equivalent to providing for about 9,000 men for the whole year; also for 270,000 Territorials for about a fortnight, which is equivalent to about 10,000 men for the year. Provision may therefore be said to have been made in Army Estimates for 200,000 men for a year. The increase necessary owing to additional 50,000 men will therefore be about one-quarter of subheads A. B. C. D. E. J. L. N. = £329,000.

Vote 7.—Taking same proportions as in Vote 6, the additional 50,000 men will add one-quarter to provision for supplies, £3,016,000 less £102,000 Colonial Allowances = $\frac{1}{4} \times 2,914,000$ = £728,000.

Add 20 per cent. to Clothing Department, 10 per cent. to Clothing Factory Estimates = £206,000 + £25,000 = £231,000.

Total increase to Vote 7 = 728,000 + 231,000 = £959,000.

Vote 8.—Additional 50,000 men may be said to cause an increase of 10 per cent. to this Vote = £58,000.

Vote 9.—Add 25 per cent. to sub-heads J. K. L. M. N. O. = £405,000.

Vote 10.—Apart from any question of new capital expenditure for new barracks, and merely as an ordinary annual provision after new barracks have been built, add 10 per cent. to sub-heads A. B. C. D. and 20 per cent. to sub-heads E. F. G. H. J. K. = 24,000 + 318,000 = £342,000.

Vote 11.—Add 10 per cent. = £7,300.

Vote 12.—No change.

Vote 13.—Number of officers is being increased by 50 per cent., therefore add 50 per cent. = £904,000, of which £301,000 may be debited to voluntary army, and £603,000 to compulsorily enlisted army.

Vote 14.—The provision made in this Vote is for pensioners from an army about 380,000 strong. It is now proposed to have 433,000 regulars, including the 20,000 N.C.O.'s with compulsory army. Proportionate increase will be £265,000, of which half may be debited to compulsory army as due to the 20,000 regular N.C.O.'s with it.

TABLE B.

Comparison with Army Estimates, 1911-12, showing increases and decreases on each vote due to the formation of a compulsorily enlisted army of one million men, of which 150,000 are with Colours in peace.

Vote No	Service	Increase on 1911-12 Estimate £	Decrease on 1911-12 Estimate £	Remarks.
1	(a) Pay of 6,000 Officers at increased Rate of Pay	1,740,000		See attached explanatory remarks upon each Vote.
	(b) Pay of 20,000 Regular N.C.O.'s ...	1,070,000		
	(c) Pay of 13,000 Reserve Officers ...	199,000		
	(d) Pay of 150,000 men	228,000		
	(e) Credit for 617 Regular Officers, 741 Regular Sergeants and 377 Regular Rank and File with Special Reserve no longer to exist, but whose pay is provided in Army Estimate of 1911-12. ... ..	...	164,043
	(f) Credit for permanent staff of Territorials taken in Vote ... ..	...	see vote 4
2	Medical Vote	150,000		
3	Abolition of Special Reserve ... ..	...	742,000
4	Abolition of Territorial Force ... ..	...	2,766,000
5	See explanations of Table A.	100,000		
6	Provision for Compulsory Army	732,000		
7	" " " "	3,201,680		
8	" " " "	87,150		
9	" " " "	1,215,000		
10	" " " "	451,000		
11	nil			
12	nil			
13	See explanations Table A.	603,000		
14	" " " "	132,500		
	TOTALS	9,999,330	3,672,043	
		3,672,043		
	Net increase	6,327,287		

EXPLANATIONS OF FIGURES IN TABLE B.

Vote 1.—(a). Six thousand officers to be paid at increased rate.

The average pay, allowances, etc., of regimental officers plus proposed increase is £275 per annum, but among the 6,000 officers concerned, allowance must be made for Commanders and Staffs, therefore average pay of an officer had better be taken as £290, and total pay, allowances, etc., of 6,000 officers = £1,740,000.

(b). Pay of 20,000 regular N.C.O.'s, of whom about 10,000 have the rank of sergeant and upwards. Average of £70 per annum for sergeants and upwards on increased rate = £700,000. Remaining 10,000 corporals at average of £37 = £370,000. Total pay of regular N.C.O.'s with compulsory army = £1,070,000.

(c). Pay of 13,000 reserve officers for, say, three weeks; of these about 4,000 are captains drawing for three weeks' training about £18, and 9,000 are subalterns drawing £13 = £72,000 + £117,000 = £199,000.

(d). Pay of 150,000 men at one penny per day = £228,000.

(e). Credit for 617 officers, 741 warrant officers and sergeants and 377 rank and file of the Regular Army serving with Special Reserve, and whose pay is provided in Vote 1 of Army Estimate, 1911-12, = $(617 \times 190) + (741 \times 53) + (377 \times 20) =$ £164,043.

(f). Credit for pay of permanent staff officers and N.C.O.'s of Territorial Force is taken in Vote 4.

Vote 2.—Pay of medical establishment looking after 179,000 men at home and abroad, and cost of nursing, and medicines for same is £403,000. A great portion of this staff will be able to include the compulsory army in their duties, and a provision of £150,000 will probably suffice for extra expenditure involved.

Vote 3.—Abolition of Special Reserve saves the whole of this Vote = £742,000.

Vote 4.—Abolition of Territorial Force will save the whole of this Vote = £2,766,000.

Vote 5.—Increase of £100,000. See explanations, Table A.

Vote 6.—Provision in Estimates is for 200,000 men (see explanations of Table A.); for compulsory army add 50 per cent. of sub-heads A. B. E. L. and 75 per cent. of sub-heads D. I. N. = $135,000 + 9,500 + 175,500 + 83,000 + 630,000 + 132,000 + 132,000 =$ £732,000.

Vote 7.—Provision in Estimates, 1911-12, is for 200,000 men; therefore for compulsory army of 150,000 add 75 per cent. to sub-heads A. B. C. E. of supplies, and add 10 per cent. to sub-heads H. J. Q. of clothing department = $1,263,000 + 564,000 + 345,000 + 52,000 + 9,780 + 440 + 7,460 =$ £2,241,680.

Average cost of clothing a recruit is about £10, but compulsory army only requires field service clothing, average cost may therefore be taken at £7, and then total cost of clothing 150,000 men = £1,050,000.

Total increase on Vote 7 = £3,291,680.

Vote 8.—Add 15 per cent. = £87,150.

Vote 9.—Add 75 per cent. to sub-heads J. K. L. M. N. O.
= 140,600 + 940,000 + 260,000 + 46,000 + 60,000 + 173,700
= £1,215,000.

Vote 10.—Apart from initial capital expenditure in the building of new barracks, and simply for an ordinary annual provision after barracks are built, add 20 per cent. to sub-heads A. B. C. D. For sub-heads E. F. and J. nothing is provided since complete provision of barracks will be arranged as capital expenditure.

Add 75 per cent. to sub-head G.

Increase = 39,000 + 3,200 + 2,940 + 3,800 + 402,000 =
£451,000.

Vote 11.—Nil.

Vote 12.—Nil.

Vote 13.—£603,000. See explanations of Table A.

Vote 14.—£132,500. See explanations of Table A.



WIRELESS TELEGRAPHY AND TELEPHONY

[Translated from *Nauticus* and published by permission].

(Continued from July JOURNAL, page 997.)

II. THE ECONOMIC IMPORTANCE OF WIRELESS TELEGRAPHY.

WITH the growing interest in wireless telegraphy, there has naturally been an immeasurable increase in the number of new inventions and designs. In the foregoing pages it has only been possible to mention the most important. For those specialists who wish to keep in touch with all improvements in this domain the excellent Year-book for Wireless Telegraphy and Telephony published by Dr. Eichhorn, which has already been mentioned in *Nauticus* for 1908, is recommended.

The economic importance of wireless telegraphy lies in its employment for the transmission of information between ships at sea; ¹ the shore and ships at sea, and vice versâ; and, in certain cases, between various places on shore over either sea or land.

In the first two cases wireless telegraphy alone holds the field. In the cases last mentioned, it is seldom employed. Its use is generally limited to cases in which communication by wire presents great technical difficulties or would not pay, as, for example, for communication over mountains or wild territories, or between islands when the number of messages is small.

As wireless telegraphy develops, however, it may be anticipated that its employment will become the rule rather than the exception. From this point of view, the development of directed wireless telegraphy should be particularly important. Wireless telegraphy will then be able to compete on equal terms with cable telegraphy, which it will advantageously supplement, and it will, in certain cases, displace uneconomical cables. Wireless telegraphy is already of importance for communicating to and from ships, and to and from places which are not connected by wire. There are now a very considerable number of wireless stations in use; these will be dealt with later on.

¹ Recently it has also been used with air-craft.

A. WIRELESS TELEGRAPHY IN CONNECTION WITH SHIPS.

The employment of wireless telegraphy for the exchange of news between ships, and between ships and the shore, has for various reasons, very considerably increased in recent years.

General Telegraphic Communication.

The efficiency of all wireless stations has been considerably improved as regards range and, particularly, as regards reliability. The total number of ship stations and shore stations intended for communicating with ships has much increased. The possibility of exchanging telegrams has thus been extended. The traveller who formerly was, on leaving port, practically cut off from the rest of the world, is now able to communicate with the whole civilized world. Many sea voyages which could not be undertaken in the past because, for business or other reasons, it was impracticable to be without means of communication for a long time, can now be taken without hesitation in view of the reliability and rapidity of wireless telegraphy.

Press Service.

The press service, that is, the regular daily distribution of news, maintained by the large stations at Norddeich, Clifden, etc., ensures people at sea being kept continuously in touch with all generally important or interesting events. This distribution of news takes place extraordinarily rapidly. The traveller on board a liner is consequently supplied with the latest news more promptly than an ordinary individual on shore, who has to wait until his newspaper is delivered at his house. On leaving a liner, a traveller may find that information which reached him several days previously by wireless telegraphy is only just being published in the newspapers as the latest news.

Chess matches have even been played through the agency of wireless telegraphy.

As an Aid to Navigation.

To these advantages of wireless telegraphy, whose importance lies mainly in their convenience for the travelling public, must be added those which are of the greatest importance for navigation. As it is a rare occurrence for a large or moderate-sized steamship to be beyond the range of wireless communication with other ships or coast stations, the danger to passengers and crew, as well as to ship and cargo, in case of shipwreck, is considerably reduced. In most cases assistance can be summoned in good time. There have already been a large number of cases in which men's lives and valuable property have been saved through prompt assistance obtained by means of wireless telegraphy. The following article from

the *Hamburger Fremdenblatt* gives briefly a few such instances:—

Saving of Ships.

"The saving of the 'Swakopmund' which, on the 13th December, 1910, had lost her rudder in a heavy sea in the Bay of Biscay, was effected in difficult circumstances. The message transmitted by this steamer to the 'Cap Arcona' was repeated by the 'Cap Arcona,' and reached vessels at Brest and Vigo. Regardless of the heavy sea, vessels left these ports in search, but they could not find the 'Swakopmund.' On the 14th December, the s.s. 'Itzehoe,' of the German-Australian Steam Navigation Company, appeared on the scene, and endeavoured for days to take the 'Swakopmund' in tow, but on account of the heavy seas the tow-ropes repeatedly parted. With the assistance of the s.s. 'Wismar,' also belonging to the German-Australian Steam Navigation Company, which arrived subsequently, Plymouth was eventually reached.

"The recent accident to the 'Republic' in the Atlantic, in which case 600 men were saved from certain death by means of wireless telegraphy; the accident to the 'Slavonia' near the Azores; the Messina earthquake, which rendered the Straits of Messina unnavigable; and the sinking of the 'Kentucky,' are other cases that will be remembered.

"If, for example, the 'General Chanzy' had been fitted for wireless telegraphy, it would have been easy for her to have communicated with the mail steamer 'Kleist,' of the North German Lloyd, which passed the scene of the accident the same night at a distance of only about 50 miles. A great disaster would thus have been avoided.

"The American press has recently stated that, in 1909, 1,800 men and 40,000,000 dollars worth of material were saved in the United States by means of wireless telegraphy.

"In September, 1908, the s.s. 'Cap Frio,' of the Hamburg South American Steam Navigation Company, ran aground on the coast of Argentina. Through the aid of wireless telegraphy all the passengers and the whole of the cargo were saved.

"A similar accident occurred in March, when the s.s. 'Hohenstaufen' ran on shore near Bahia. By means of wireless telegraphy other steamships were called to her assistance, or the vessel would have been lost owing to the surf."

It is also of importance that vessels are able promptly to report hindrances to navigation, such as floating wrecks, icebergs, etc.

Time-Signal Service.

For some time the large stations at Norddeich and the Eiffel tower have been carrying out a time-signal service. Other large stations will soon follow their example. Ships can now

adjust their chronometers on the high seas with the greatest accuracy. Mistakes in astronomical reckonings on account of incorrect times are no longer possible.

The Norddeich time-signal service is conducted in the following manner. The time-signal gives mean Greenwich noon and mean Greenwich midnight. To warn observers strokes of $\frac{1}{2}$ of a second duration are made at regular intervals for several minutes before 12 o'clock. The commencement of each stroke is the time fixed. The strokes are given in groups, which are separated from one another by longer pauses. In the groups the strokes follow at intervals of a second. The second-interval facilitates the comparison of the second-readings of the chronometer with the second-signals of the time-signal station, and finally with the signal 12 hrs. 0 mins. 0 secs. Mean Greenwich time is selected for the time-signal because nautical astronomical calculations are based on this time.

Notice of Storms.

The notice of storms which is given by all coast stations is also of great importance. Vessels equipped with wireless telegraphy apparatus receive, at fixed times during the day, reports concerning any noteworthy changes in the atmosphere. This intelligence service is of special importance for small fishing vessels, large numbers of which were often lost in bad weather before the introduction of wireless telegraphy. Fishing vessels are therefore being equipped with wireless telegraphy apparatus to an ever increasing extent. It will also be possible for vessels that are making good catches to inform other vessels who are on poor grounds, or who are just starting from their home ports.

Weather Forecasts.

Not only have ships at sea the benefit of a meteorological service, but that service, in its turn, has the advantage of receiving reports concerning wind, air pressures, etc., from ships, and this information is sent out to ships from the meteorological centres. The weather reports sent in from ships at sea have been made use of for years by the American weather Bureau for completing their weather charts. A similar addition to the meteorological service has not yet been organized in Europe. From the 1st February to the 30th April, 1909, and in August and September of the same year, however, joint experiments with this object were undertaken by the German and English Governments. The method of carrying out the experiments and the results obtained have been described in detail by the Director of the Meteorological Observatory at Aachen, Dr. Polis, who co-operated in the experiments, in the Year Book for Wireless Telegraphy, vol. 3, page 501, *et seq.* The following particulars are taken from that publication. All British steam-

ships equipped with wireless telegraphy apparatus, and those of the Hamburg-American Line and the North-German Lloyd similarly fitted, took part in the experiments. The observation area was limited, the boundaries being 10° and 45° west, and 40° and 60° north. The weather telegrams from the ships were coded in accordance with a special scheme and transmitted to the wireless telegraphy stations on the west coast of England, whence they were immediately sent on to the Meteorological Institute in London, the German Marine Observatory at Hamburg and the Meteorological Observatory at Aachen (Aix-la-Chapelle). On an average about 15 to 20 weather telegrams were sent daily. In the first experimental period a large number of telegrams arrived too late for them to be utilized for the weather forecasts. These were principally telegrams from ships near the western limit, which had to be transmitted *via* other ships nearer the coast. In the second experimental period, therefore, the western limit of the observation area was fixed at 30° west. It was then exceptional for telegrams to arrive too late. The experiments successfully demonstrated that the transmission of weather reports from ships at sea can be regarded as generally reliable, and that weather charts completed with the aid of this information afford a better idea of the meteorological situation.

It is very desirable, in the interests of navigation, that a meteorological service from ships should be permanently organized at an early date.

International Regulation of Wireless Telegraphy.

The possibility of a greater exchange of information by means of an increased number of wireless telegraph stations is dependent on the international regulation of wireless communication. Only if all wireless stations are bound to accept and repeat messages from other stations, to work in accordance with common rules, and to arrange for the collection of fees in a uniform manner, can the exchange of wireless messages throughout the world work smoothly. To attain this was the task of the International Radiotelegraphic Conference which met at Berlin in the autumn of 1906. The agreements which were drafted at that Conference fully meet these requirements. The most important of these agreements was given in *Nauticus* for 1908, pages 444 and 445. The desired results have not, however, been fully attained. England, Italy, the United States and Japan, for a variety of reasons, have had to make reservations. The Conference arranged to take place in London in 1912 will, therefore, have much to engage its attention.

The German Working Company.

What was not wholly achieved by international agreement has now been attained by an agreement between a newly-formed German "Working" Company and the Marconi

"Working" Company. Free communication between most of the stations in the world has been secured by this agreement, which is, of course, economically of the greatest importance. It will probably considerably lighten the work of the forthcoming International Conference in London, and will enable sound suggestions, based on practical experience, to be put forward.

On the instigation of the Wireless Telegraphy Company, a special company under the title of "German Working Company for Wireless Telegraphy," with headquarters in Berlin, has been founded. The President of the company is one of the Directors of the Wireless Telegraphy Company. The object of the undertaking is the installation and operation, in Germany, of wireless telegraphy, telephony and signalling by means of electric waves. The associated companies are the *Compagnie de Télégraphie sans fil, Société Anonyme*, Brussels (a Marconi "Working" Company); the Wireless Telegraphy Company, Berlin; the General Electricity Company, Berlin; and the Wireless Telegraphy Company, System of Professor Braun and Siemens Halske. The *Compagnie de Télégraphie sans fil* has brought into the new company all its wireless telegraphy stations on board German steamships, as well as its agreements with the shipping companies. The numerous Marconi stations on board German steamships (41) will therefore now be administered by the new "German Working Company," and thus German steamships are no longer dependent on a foreign firm as regards this important means of communication, a state of affairs to which objections have for a long time been raised and which might in certain circumstances have been of great importance in time of war.

The following, which has been taken from the new company's agreements, is of interest:—

The Marconi and Telefunken companies have agreed to compete no longer with regard to wireless telegraphy, telephony and signalling on board German steamships with the exception of the ships of the German Navy. This domain is to be left entirely to the "German Working Company." As regards the recognition of the patents of the Marconi and Telefunken companies, certain mutual agreements have been arrived at. The material for the equipment of stations will, as a general rule, be furnished by the "German Working Company" in Germany, and by the Telefunken Company in particular. The wireless stations worked by the Marconi Companies (*viz.*, the *Compagnie de Télégraphie sans fil*, Brussels; the Marconi Wireless Telegraphy Company, Limited, London; the Marconi International Marine Communication Company, Limited, London; the Marconi Wireless Telegraph Company of America, New York; the Marconi Wireless Telegraph Company of Canada, Montreal; the *Compagnie Française Maritime et Coloniale de Télégraphie sans fil*, Paris; the *Compagnie Marconi*

de Telegraphia sin Hilos del Rio de la Plata, Buenos Aires), are to treat messages received from stations belonging to the German company in the same way as messages received from stations worked by the Marconi companies. Moreover, Marconi has written to the Italian Government asking that the Italian coast stations may be opened for the exchange of messages with German steamships. Traffic is to be regulated in general by the working regulations of the Marconi companies, which are based on the experience of many years. An agreement has already been arrived at regarding the calculation of charges for telegrams. The new company also undertakes the training of the *personnel*, whose best training will, however, always be practical experience of extensive international traffic.

The great economic importance of this agreement between Marconi and the German company is obvious. The men who effected it have already been decorated by the Emperor in recognition of their services.

B. EXTENSION OF WIRELESS SYSTEMS.

The extension of wireless systems has, in general, followed the technical development of wireless telegraphy. The industry has everywhere had a hard struggle to pay its way. Although a large number of wireless stations have been constructed, up to the present the economic results achieved in the wireless industry have been negative. Wireless telegraphy has, probably more than any other branch of technical science, required huge sums for its development and will continue to do so for some time. The number of engineers necessary is, in comparison with other industries, extraordinarily high. The carrying out of experiments, in which ships must participate and for which large shore stations must be erected, is very costly.

The prices offered for the apparatus were, however, in view of its former relative imperfection, not sufficiently high to ensure any profit. Only the latest development has produced a change in this respect. On account of the much better results obtained with wireless telegraphy, the industry has been able to demand higher prices, which have been paid without very much opposition. At the same time the importance of wireless telegraphy has become more widely recognized, and the total returns from the new productions have increased enormously.

Marconi and the Telefunken Company.

The number of firms engaged in the manufacture of wireless installations is of real importance for the world. At first Marconi had a monopoly. Soon, however, an unwelcome competitor appeared in the Wireless Telegraphy Company—Telefunken—or its forerunners. Marconi much valued the recognition of the German scientist, Professor Slaby (in the

pamphlets of the Marconi companies an opinion of Professor Slaby's regarding Marconi's invention is still given as authoritative), but he did not achieve much from it, and strenuous efforts in Germany in the wireless domain largely restricted his field of activity. Marconi remained, however, for a long time, as can now be seen more clearly, easily first in the domain opened up by him. With his bold schemes and his great technical ability he outdistanced all others. He was energetically supported by the British Government and by financial circles. He constructed his first large station at Poldhu, not without success, at a time when the reception of faint signals at a distance of some ten kilometres (6.2 miles) was still considered very satisfactory in Germany. Only recently has German industry overtaken Marconi. The musical quenched spark system is certainly superior to the Marconi methods, so far as these are known. This system has indeed commenced a triumphal progress through the world. The Telefunken system is now almost as widely extended as the Marconi system. An idea of the extent of the Marconi system can be obtained by considering the numerous Marconi companies. They have already been enumerated in the remarks concerning the agreement with the Telefunken Company.

The Telefunken Company has, however, also a large number of subsidiary companies and representatives distributed all over the world. In America there is the Telefunken Wireless Telegraphy Company of the United States and in China the Telefunken East Asiatic Wireless Telegraphy Company. In Australia the Telefunken Company has the Allied Australian Wireless Telegraphic Company. In most other countries the Telefunken Company is dependent on the establishments of its parent firms, the A.E.G. and Siemens and Halske. The new "German Working Company," the connecting link with Marconi, in particular must not be forgotten.

The Telefunken Company has established, principally, stations for ship communication; there are some 900 of these in all, 200 of which are already fitted up on the musical quenched spark system, in spite of its having been so short a time in existence. How these figures compare with those for the Marconi Company cannot be definitely stated. It is asserted that they are smaller.

Shore Communications.

The connection of distant points of land by wireless telegraphy to supplement, or compete with, cables was first successfully effected by Marconi. Although quite recently there was some doubt regarding the working of the large trans-oceanic stations of Clifden, Ireland, and Cape Breton, Glacé Bay, the fairly reliable transmission of news by these two stations can now be observed from every wireless station. In addition,

Marconi has large stations of an older date at Poldhu and Cape Cod, Massachusetts. Stations are under construction at Coltano near Pisa and in the Italian colony of Erithrea.

As regards large stations, the Telefunken Company has not only overtaken, but has outstripped, Marconi. No large stations of other systems need be considered, especially as installations which formerly could, with some justification, be described as large stations, are no longer regarded as such under present conditions. Stations with an aerial power of 10 K.W. or above can be considered as large stations.

The Poulsen and de Forest stations mentioned in *Nauticus* for 1908 all have less power than this; but the French Government station on the Eiffel Tower may be classed as a large station.

In the construction of its new large stations the Telefunken Company has, in some places, used wireless telegraphy to replace cable or land lines; the experience of the next few years will show how far this policy is justified. The following are the large stations constructed by the Telefunken Company:—

Germany, Norddeich, Nauen; Sweden, Göteborg; Austria, Pola, Sebenico; Hungary, Cattaro; Spain, Madrid; Russia, Batum; Sumatra, Sabong; Australia, Sydney, Fremantle; New Zealand, Doubtless, Bluff; Brazil, Para, Manaos, Santarem; Peru, Iquitos, Lima; Cuba, Habana.

OTHER SYSTEMS.

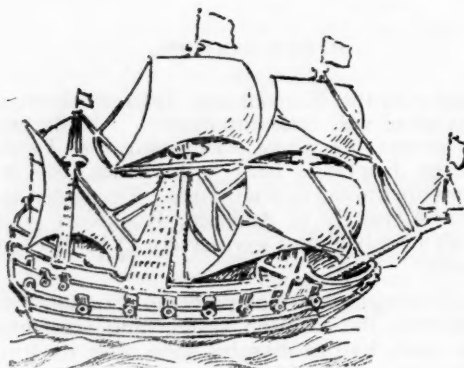
Compared with the Marconi and Telefunken organizations, other systems are of very little importance. Whilst the Marconi organization covers the whole earth and the Telefunken all countries except England, Italy and France, the other well-known systems are limited to small areas: Fessenden to America, de Forest almost entirely to America, Rochefort (who recently combined with Lepel) almost exclusively to France, and Eisenstein to Russia.

The Radiotelegraphic Company of London, which was formed to develop the Poulsen system and was mentioned in *Nauticus* for 1908, had to dissolve soon after its formation on account of business difficulties.

In Germany the C. Lorenz Company has undertaken the further development of the undamped system. This company has also, as already mentioned in the technical portion of this article, developed the Goldschmidt high-frequency machine. A separate company, called the High-frequency Machine Company, under the management of the Lorenz Company, has been formed especially for the development of the Goldschmidt system.

III. CONCLUDING REMARKS.

The course of the development of wireless telegraphy in recent years has not only been of great importance technically and economically to the world at large, but particularly to Germany. As a result of the work of the Telefunken Company this country has succeeded in overtaking Marconi. If the performances of the C. Lorenz Company in the further development of the undamped system are considered, it can be regarded as certain that Germany now leads the rest of the world in the domain of wireless telegraphy. It is, however, also certain that wireless telegraphy is still only in the preliminary stages of its development and that there is a still greater future awaiting it. It will be the task of our industry to keep at the head of this future development, and by combining the technical ability available in Germany with the wide experience of German wireless technical science to secure permanently a leading position.



EVENTS OF THE MILITARY YEAR 1911, IN THE ARMIES OF FOREIGN POWERS.

(Continued from July JOURNAL, page 957).

UNITED STATES.

(1) Military Expenditure—(2) Strength and Organization (a) *Peace Strength*; (b) *Distribution*; (c) *War Office and Higher Organization*; (d) *Officers*—(3) *Infantry*—(4) *Cavalry*—(5) *Artillery*; (a) *Coast Artillery*; (b) *Field Artillery*; (c) *Miscellaneous*—(6) *Engineers and Signal Corps*—(7) *Other Arms and Departments* (a) *Supply*; (b) *Transport*; (c) *Medical*; (d) *Army Pay Personnel*—(8) *Aeronautics*—(9) *Reserves and Mobilization*—(10) *Musketry and Small Arms*—(11) *Manœuvres*—(12) *Education*—(13) *Discipline*—(14) *Recruiting*—(15) *Horses*—(16) *Permanent Communications*—(17) *Fortresses and Defences*.

(1) MILITARY EXPENDITURE.

The Military Estimates for 1911-12 amounted to £22,119,882.

A. Appropriations affecting the Regular Army.

Act.	1910-11.	Supplement- ary credits 1910-11.	1911-12.	Difference. + or -
	£	£	£	£
1. Army Appropriation	19,088,143	230,034	18,614,950	- 703,227
2. Fortifications (excluding Panama Canal)	1,123,440		1,094,741	- 28,699
3. Military Academy	396,842	1,200	232,710	- 165,332
4. Legislative Expenses	504,309		505,571	+ 1,262
5. Sundry Civil Expenses	1,826,679	24,056	1,671,910	- 178,825
Total A.	£22,939,413	255,290	£22,119,882	-£1,074,821

B. Appropriations affecting Military Forces generally.

	£		£	£
6. Pensions	31,151,600		30,736,400	-- 415,200
7. Militia Act, 1903.	400,000		400,000	
8. Militia Act, 1908.	400,000		400,000	
9. Panama Canal.	7,571,000		9,712,000	£2,141,000
Total B.	£39,522,600		£41,248,400	+ £1,725,800
Grand Total	£62,462,013	£255,290	£63,368,282	+ £650,979
				- £600,000 for fortifications.

NOTE.—Large sums appropriated in Army Votes for dredging harbours, rivers, &c., are not included in the above figures as the works are not military ones.

(2) STRENGTH AND ORGANIZATION.**(a) Peace Strength.**

The peace strength of the Army in 1911 was 82,377, made up as follows:—

Infantry, 28,537; Cavalry, 14,051; Artillery, 24,854 men, including Coast Artillery, and 144 field guns; Other Arms and Departments, 14,929.

NOTE.—The Philippine Scouts, 180 officers and 5,732 men, are not included above, as they are intended for local defence only, and are not part of the Regular Army.

There are no reserves for the Army, which in consequence has to be brought up to War strength by recruiting.

(b) Distribution of Troops.

DISTRIBUTION.—The geographical distribution of the United States Army on the 15th October, 1911, is shown in the following table:—

	Officers.	Men.	Total.
United States	3,338	55,990	59,328
Alaska	51	1,085	1,136
Philippines:			
Regular Army	697	11,527	12,224
Philippine Scouts	173	5,442	5,615
Porto Rico	32	585	617
Hawaii	122	2,267	2,389
Isthmian Canal Zone	52	824	876
Troops en route, &c.	96	1,394	1,490
Total	4,561	79,114	83,675

The above table included 3,422 enlisted men of the Hospital Corps, distributed as follows:—

United States	2,575
Alaska	52
Philippines	641
Porto Rico	17
Hawaii	57
Isthmian Canal Zone	22
En route	58
Total	3,422

It also included 166 1st lieutenants of the Medical Reserve Corps on active duty.

(c) War Office and Higher Organization.

SECRETARY FOR WAR.—In May, 1911, Mr. J. M. Dickinson resigned his appointment as Secretary of War, and was succeeded by Mr. H. L. Stimson.

TERRITORIAL DIVISIONS.—By War Department General Order of the 19th May, 1911, the territory of the United States was divided into four territorial Divisions, comprising in all

ten departments. This order took effect on the 1st July, 1911. The general idea was that the Department Commanders were to be relieved of administrative work, which, under the new scheme, was to be done by the Divisional Commanders and their Staffs. The Department Commanders are now free to devote their time and attention to the training of the troops. A saving in Staff officers, clerks and messengers was also effected as the department staffs were reduced.

The Hawaiian Islands, which formed part of the Department of California, have since been formed into a department by themselves, though they still form part of the Western Division. Brig.-General M. M. Macomb was given the command of the Department of Hawaii.

The Philippine Division continued to consist of the three Departments of Luzon, the Visayas, and Mindanao, but the new system was adopted under which the Department Commanders were relieved of all administrative work.

The Panama Canal zone has been made part of the Eastern Division.

"DEFENCE BOARD," PHILIPPINE ISLANDS.—The name of the "Fortification Board," Philippine Islands, has been changed to "Defence Board," Philippine Islands.

The duties of the Board are to consider all questions of defence and the posts pertaining thereto for the Philippine Islands, and to submit reports thereon for the information of the Secretary of War. These reports are forwarded through the Commanding General, Philippines Division, who will endorse thereon his views on the matter.

FIELD BAKERY.—In future a field bakery will not normally form part of a Division; but for each Division at the front one field Bakery will be assigned to the Line of Communication troops.

(d) Officers.

EXTRA OFFICERS.—On the 3rd March, 1911, Congress passed a Bill authorizing an increase of 200 in the number of officers. This number was that estimated as necessary for Militia duty under the plan of having one Regular officer for duty with each infantry regiment, squadron of cavalry, and battalion of field artillery in the Organized Militia. The Bill also authorized an increase of 30 officers in the Quartermaster-General's department. This increase of 205 officers will provide instructors for the Militia, but it will not help to remedy the lack of officers doing duty with units. Of these 200 extra officers, 100 will be appointed during the present fiscal year, and 100 during the next fiscal year.

Besides the Extra Officers' Bill, Congress passed a Bill to the effect that officers who had suffered by regimental promotion should be restored to the rank and position that they would have occupied if promotion had always been in accordance with the present law. It was expected that some 117 officers would

be promoted under this Act. However, the actual promotions made, up to the end of 1911, only numbered 44, of which half are to the rank of Lieut.-Colonel and Colonel respectively.

Congress also authorized an increase in the number of Engineer officers.

(3) INFANTRY.

PEACE ESTABLISHMENT.—In accordance with War Department General Order No 138 of the 9th October, 1911, the peace establishment of enlisted men for an infantry regiment is now as follows:—

In the United States.

12 Companies of 65 men each	780
Regimental and Battalion N.C.O.'s	8
Machine Gun Platoon	21
Regimental Band	28
Mounted Scouts	15
Head Quarter Detachment	17

869

In Philippine Islands, Hawaiian Territory, and Panama.

12 Companies of 72 men each	864
Regimental and Battalion N.C.O.'s	8
Machine Gun Platoon	21
Regimental Band	28
Mounted Scouts	15
Head Quarter Detachment	17

953

(4) CAVALRY.

PEACE ESTABLISHMENT.—In accordance with War Department General Order No. 138 of the 9th October, 1911, the peace establishment of enlisted men for a cavalry regiment is now as follows:—

In the United States.

12 Troops of 65 men each	780
Regimental and Squadron N.C.O.'s	8
Regimental Band	28
Machine Gun Platoon	24
Head Quarter Detachment	14

854

In Philippine Islands, Hawaiian Territory, and Panama.

12 Troops of 70 men each	840
Regimental and Squadron N.C.O.'s	8
Regimental Band	28
Machine Gun Platoon	24
Head Quarter Detachment	14

914

EQUIPMENT.—At the end of 1911 a sufficient quantity of personal and horse equipment had been manufactured at the

Rock Island Arsenal, after designs submitted by the Cavalry Equipment Board, for the proper equipment of the members of the Board and one troop of cavalry for use in a field test.

THE CAVALRY SEAT.—War Department General Order No. 29 of the 4th March, 1911, made some slight modifications in the regulation cavalry seat.

(5) ARTILLERY.

(a) Coast Artillery.

STRENGTH.—The annual report of the Chief of Coast Artillery shows that one complete detail of officers and men to man the batteries already constructed, and certain additional defences which have been recommended, requires 1,376 officers and 33,906 men of Regular Coast Artillery, and 908 officers and 21,204 men of Militia Coast Artillery, in all 2,278 officers and 55,110 men. The present establishment of Regular Coast Artillery is 715 officers and 18,471 men, and of Militia Coast Artillery 389 officers and 7,004 men. This gives a shortage of 1,174 officers and 29,635 men. The foregoing, however, relates to the personnel for the armament now completed or under construction, "and in addition that proposed as necessary for complete national defence." Considering only the personnel required for the armament already installed or being constructed at home and in the insular possessions, the deficiency is only 301 officers and 8,549 men. The authorized establishment of men of the Regular Coast Artillery was reduced by 850 during the year.

ARMAMENT.—Three additional 14-inch guns were completed during the year. One of these is a late model 40 calibres long with a double tube. The 14-inch wire-wound gun continues to give satisfactory results when tested. All 6-inch and 14-inch guns, and all 12-inch howitzers now being manufactured are of the wire-wound type.

EXPERIMENTS.—The lining of a six-inch gun that had been worn out by being fired was removed by expanding the entire gun by heat and then contracting the lining by cooling it by the application of water to the interior. This obviated the necessity for boring out the old lining, and resulted in a considerable saving both of time and money. It is hoped that this method can be used in removing the inner tubes of guns now being constructed with double tubes, thus offsetting the increased original cost of adding the lining tubes to these guns. The object of adding the lining tubes to guns of new construction is to prevent the dangerous extension of heat cracks which are found to be developed in the bore by the action of the powder gases.

POWDER.—During the past year the Army powder factory has succeeded in producing a powder for 12-inch howitzers suitable for use in all zones. Heretofore it has been necessary to use one type of powder for the inner zones, in order to avoid an excessive amount of unburned fragments being blown from

the muzzle, and another type for the outer zones to avoid excessive pressures. The use of a single powder for all the zones will greatly facilitate issues, and will probably permit of the adoption of a new and advantageous system of preparing powder charges for howitzers. This system is now being tested by the Coast Artillery.

Statements made by Sir Hiram Maxim appeared in *Engineering*, and in the Press of the United States, to the effect that the smokeless powder used by the United States Army and Navy could not, on account of the multiperforated form of grain employed, be fired at temperatures as high as 150 degrees F. without endangering the gun. A series of firings was therefore conducted at the Sandy Hook Proving Grounds with an 8-inch gun, whose powder charges were artificially raised to a temperature of 208 degrees F., a much higher temperature than any likely to occur on service. The firings were made with full charges of multiperforated powder, and with the service weight of projectile. The test was carried out without the slightest damage either to the gun or to the mounting. Some increases in velocity and pressures were obtained, as was to be expected; but neither irregular nor disastrous pressures, such as were predicted by Sir Hiram Maxim, resulted. As the temperature to which the gun and powder were raised was much greater than any that will occur under service conditions, it has been demonstrated that no dangerous firing pressures are likely to occur on service from any rise in the temperature of either gun or powder.

AMMUNITION.—Sharp pointed caps for improving the ballistic qualities of the projectiles have been developed for all calibres of sea coast guns, from 5-inch to 12-inch inclusive; but these caps cannot be added until the shot hoists of emplacements have been broadened. The short caps on the projectiles at present are being threaded so that, as soon as conditions permit, the pointed caps may be added on the spot. The advantages so far secured by sharp pointed caps for 12-inch howitzer projectiles have not been such as to justify the cost of their adoption for projectiles already manufactured.

(b) Field Artillery.

PEACE ESTABLISHMENT.—In accordance with War Department General Order No. 138 of the 9th October, 1911, the strength of a battery in enlisted men will be in future :—

Light and Mountain Artillery.

1 First Sergeant, 1 Quartermaster-Sergeant, 1 Stable Sergeant, 6 Sergeants, 12 Corporals, 1 Chief Mechanic, 1 Horse Shoer, 3 Mechanics, 3 Cooks, 2 Musicians, 102 Privates. Total 133. Each Horse Battery has one Mechanic and 16 privates in addition. Each Artillery Regiment (six batteries) has nine mounted orderlies and a Headquarter Detachment of 33 men. Of this Headquarter Detachment 20 are privates, and of them 8 are at Regimental Headquarters and 6 are at the Headquarters of each battalion (three batteries).

MATERIAL.—The Chief of Ordnance in his last report says:—

Field Artillery.—Of the 264 batteries required for the mobile army of 450,000 officers and enlisted men in continental United States, the necessary number of field guns, carriages, limbers, and equipments, for only 150 batteries are now in the possession of the Regular Army or Organized Militia, in Ordnance Establishments, under manufacture, or to be manufactured under appropriations now available."

This is an improvement on the figures shown in 1910; but the Chief of Ordnance regrets that financial conditions have rendered impossible the acquisition of a much larger reserve of field artillery material.

The greater part of the reserve consists of 3-inch batteries. Work on this class of equipment continues to remain largely in abeyance, and effort has been directed mainly towards the procuring of field guns and howitzers of larger calibre. A limited number of 3.8-inch gun batteries has been completed and is in store. Issues of 4.7-inch field guns have been made to one battery of the Fifth Field Artillery Regiment, and a considerable number in addition are on hand ready for service. Work on batteries of 3.8-inch, 4.7-inch and 6-inch field howitzers has been continued during the year. Certain difficulties have been encountered which, it is expected, will soon be overcome; after this a number of 4.7-inch and 6-inch field howitzers will be available for issue. The 3.8-inch material is not so far advanced as the other two types; this is due to a doubt as to whether this calibre would be finally adopted for service. It has now been decided to adopt this calibre, and the manufacture of the 3.8-inch field howitzer will be pushed forward during the year 1912.

During the year the types of field guns and howitzers have been definitely settled as follows:—

- 3-inch and 4.7-inch field guns;
- 3-inch mountain howitzer;
- 3.8-inch, 4.7-inch, and 6-inch field howitzers.

One battery of the new 3-inch mountain howitzer is under manufacture, and will be issued for service trial when finished. A combined front and rear sight, with a panoramic sight and a range quadrant, are to be furnished for this equipment, provided that the test, which has not yet been made, proves satisfactory.

FIELD GUN PROJECTILES.—Additional Machinery has been installed during the year at Frankford Arsenal with a view to increasing the facilities for the manufacture of fuses and other parts of mobile artillery projectiles. The installation of this plant has doubled the capacity of the plant for making fuses, and has increased to a somewhat less degree the capacity for making other parts of projectiles.

FIRE CONTROL INSTRUMENTS.—A type of Aubry Sextant Telemeter has been adopted for service use, and is under manufacture. It is considered a great improvement upon the present instrument, the Weldon.

The battery commander's telescope of latest foreign design has been adversely reported upon by the Field Artillery Board, when compared with the service instrument. The Board has also recommended strongly that no further tests be made of horizontal base range finders, as the number of tests up-to-date show that this type is not satisfactory, owing to the shortness of the base and the practical impossibility of keeping proper adjustment. In consequence, tests of this class will be discontinued.

SCHOOL OF FIRE FOR FIELD ARTILLERY.—A school of fire for field artillery was established at Fort Sill, Oklahoma, in June, 1911.

(c) **Miscellaneous.**

ORDNANCE.—A balloon gun, calibre 2.24-inches, firing a six-pounder projectile with a high velocity, and equipped with a semi-automatic breech mechanism to ensure rapidity of fire, has been constructed during the year. It does not appear to differ in any essential part from the 2.24-inch six-pounder Q.F. gun now used for coast defence.

The work of enlarging the Army powder factory at Picatinny arsenal, so as to provide for a capacity of 9,000 lbs. per day, is nearing completion. Approximately 385,000 lbs. of cannon powder and 67,000 lbs. of small arms powder have been manufactured during the last fiscal year.

METALLIC PACKING BOXES FOR 3-INCH AMMUNITION.—Metallic packing boxes have been developed for use in the shipment of 3-inch field and sea coast ammunition. These boxes are lighter, stronger and less expensive than the wooden boxes formerly used. Those for 3-inch field gun ammunition are being manufactured in bulk. The manufacture of those for 3-inch sea coast ammunition is awaiting the installation of the necessary machinery and forging dies, which are being procured.

(6) **ENGINEERS AND SIGNAL CORPS.**

INCREASE OF OFFICERS.—By the Act of the 27th February, 1911, the Corps of Engineers was increased by five colonels, six lieutenant-colonels, 19 majors, 17 captains, and 13 1st lieutenants; the increase in each grade extends over a period of five years.

PEACE ESTABLISHMENT.—Under General Order No. 138 of the 9th October, 1911, the peace strength of an engineer company in enlisted men is fixed as follows:—

1 First Sergeant, 1 Quartermaster-Sergeant, 12 Sergeants, 18 Corporals, 2 Cooks, 2 Musicians, 64 1st Class Privates, 59 2nd Class Privates. Total 159.

SIGNAL CORPS.—By War Department General Order No. 24 of the 17th February, 1911, the following personnel and transport are laid down for field companies of the Signal Corps :—

Personnel.

1 Captain, 3 1st Lieutenants, 2 Master Signal Electricians, 7 1st Class Sergeants, 10 Sergeants, 17 Corporals, 2 Cooks, 45 1st Class Privates, 13 Privates. Total, 4 officers (mounted) and 96 enlisted men (81 mounted).

Transport.

4 wire carts, 2 instrument wagons, and 1 kit wagon provided by the Signal Corps. 85 riding horses, 8 draft horses, 8 pack mules, 20 draft mules, and 2 field wagons, provided by the Quartermaster's Department.

The harness for the wire cart teams and the equipment for the riding horses is provided by the Ordnance Department.

OTHER ARMS AND DEPARTMENTS.

(a) Supply.

INSTRUCTIONAL COURSES.—During last year a course of instruction at the Purchasing Commissary at Chicago was prescribed for officers and non-commissioned officers of the Subsistence Department. The tour for officers will be from the 1st August to the 31st December. The course will include, from the 1st August up to the 15th October, instruction in the inspection and judging of live stock at the Union Stock Yards, the visiting of packing houses to observe the different methods of slaughtering and the subsequent handling of the carcasses, and their preparation for ultimate use as ration and sales articles, the study of machinery, inspection and care of fresh meat, preparation of cured and canned meats, cold storage, and the manufacture of lard and oleomargarine. From the 16th to the 31st October, the course will include the handling of flour from the grain to the finished product at mills in the vicinity. From the 1st November to the 31st December, the course will include the origin, manufacture, and packing of all other articles on the authorized list, the visiting of manufacturing plants in the city and vicinity, instruction in the making of awards and inspection of stores, the use of the polariscope, simple tests for adulterants, primary use of the microscope, preparation of accounts and returns, and depôt administration.

The course for N.C.O.'s will be from the 1st October to the 31st December. During October and November the course will include instruction in the inspection and judging of live stock at the Union Stock Yards, the visiting of packing houses to observe the different methods of slaughtering and the subsequent handling of the carcasses and their preparation for ultimate use as rations and sales articles, also the study of machinery, inspection and care of fresh meat, preparation of cured and canned meats, cold storage, and the manufacture of lard and oleomargarine. During December instruction will be given in the preparation of accounts and returns, and in such other depôt

administration as pertains to the duties of Post Commissary Sergeants.

Written reports and rough sketches descriptive of the methods and machinery observed will be required from time to time from officers and N.C.O.'s.

CHANGES IN RATIONS.—Changes in the various rations have been made during the year as follows:—

Garrison Ration.—Chicken has been eliminated and the issue of turkey limited to Thanksgiving and Christmas. On Thanksgiving and Christmas 39 cents per day is allowed to troops travelling on transports. The regulation requiring that at least 30 per cent. of the dried fruit ration should be prunes was rescinded.

Field Ration.—The field ration has been abolished. Since the haversack ration was adopted in 1909, the field ration, which was adopted in 1901, has been found after a thorough trial not to answer the purpose for which it was devised. Besides, whenever conditions are such that the field ration could be supplied, it would be probable that the garrison ration could just as well be furnished; the field ration, therefore, would only add another complication and cause confusion.

Haversack Ration.—Canned meat has been added to the haversack ration and pepper omitted. A condiment can is also now supplied for the purpose of carrying the coffee, sugar and salt loose.

"Filipine Ration."—To the "Filipine ration" soft bread has been added, and the rice is to be unpolished; it has also been laid down that the use of the entire allowance of the meat component and not more than 16 ounces of rice is to be used for each ration. The purchase of 1.6 ounces of beans per ration in substitution for the undrawn portion of the rice ration is to be made, and such native products as camotes, mangoes, and squash are to be used as far as is practicable.

Field Bread.—Field bread is a term applied to a type of fresh bread with a thick crust, which is made as soft and pliable as possible but strong enough to protect the bread even when handled roughly in crowded wagons and railway trucks. It is easy to make, for it is prepared after a prescribed recipe, baked in field ovens and formed into loaves of convenient size, which are easier to carry about than ordinary fresh bread. Field bread ought to remain palatable for from seven to 15 days, according to how it has been made. It is intended to be used only when troops cannot be supplied with ordinary fresh bread, and it is intended to obviate the necessity of using biscuit under these conditions of service.

ENAMEL LINED TINS.—It has been found by actual trial that a saving can be effected by the use of sanitary enamel-lined tins for food products, especially for tomatoes intended for shipment to the Philippine Islands. The sanitary enamel-lined tins add but little to the cost of the product and they

help to ensure the purity of the contents. When tomatoes are packed in this type of tin, a marked reduction in the percentage of loss is shown. With this type of tin no solder is used except on the side seams.

(b) **Transport.**

ARMY AMBULANCES.—During the year 1911 100 ambulances were purchased and constructed in accordance with specifications which have recently been modified. Some of these ambulances are now in service, and as it becomes necessary to replenish the stock at depôts others will be purchased under these new specifications. Authority was obtained for the purchase of one experimental automobile ambulance to be constructed by the White Co. of Cleveland, Ohio, for use in Honolulu.

AUTOMOBILE TRUCKS FOR ARMY USE.—The question of efficiency and economy of automobile trucks as compared with animal-drawn transport has been carefully gone into. For use in cities and on macadam roads it is found that the ordinary commercial truck is more economical and more efficient than the equivalent number of wagons. Three trucks have already been provided at the dépôt at San Francisco, Cal.; one at Fort San Houston, Tex.; one at West Point, N.Y.; and seven for use at Manila.

The question of supplying autotrucks to replace animal-drawn transport with troops in the field is also under consideration. The ordinary commercial truck is not suitable as a means of transport for the Army in the field but one truck of a special type has been contracted for, and will be tested so as to determine if a truck can be developed which can be relied upon under all field conditions.

The ordinary autotruck of commerce is too heavy when loaded to be used with safety over country bridges and culverts. The idea carried out in the experimental truck now being built is that the truck shall carry a maximum load of 3,000 lbs. (the aggregate weight being about 6,000 lbs.) and be capable of a speed such that it can do the work of at least two wagons over such ordinary country roads as troops would use.

(c) **Medical Service.**

DENTAL CORPS.—The Dental Corps, composed of Dental Surgeons and Acting Dental Surgeons, is now attached to the Medical Department of the Army.

The number of Dental Surgeons is limited by law to 60, but Acting Dental Surgeons can be employed in such numbers that the Dental Surgeons and the Acting Dental Surgeons together do not exceed 1 to each 1,000 enlisted men on the strength of the Army.

NURSES.—25 additional Army Nurses were provided for in the appropriations for 1911-1912.

NEW ORGANIZATION.—On the 17th April, 1911, authority was given for the abolition of all Companies of Instruction, Hospital Corps, and for the organization of companies A, B, C, and D, into Field Hospitals and Ambulance Companies Nos. 1, 2, 3, and 4, respectively. This is a great step in advance in the organization of the Medical Corps.

TYPHOID PROPHYLACTIC.—When orders were issued in March, 1911, for the mobilization of the "Manœuvre Division" in Texas, it was decided to immunize the entire Division against typhoid. Orders were therefore issued for the typhoid prophylactic to be administered to all officers and men. The result was that only two cases of typhoid occurred in the "Manœuvre Division," and one of these was in a civilian teamster, to whom the prophylactic had not been administered.

(d) Army Pay Personnel.

PAYMASTER'S CLERKS.—On the 3rd March, 1911, an Act of Congress was approved by the President making Army Paymaster's Clerks subject to the rules and articles of war, and giving them the same pay and allowances, and the right of retirement with the same retired pay as Naval Paymaster's Clerks. This means that Army Paymaster's Clerks are to all intents and purposes Army officers. The Comptroller has given a decision that Army Paymaster's Clerks are officers as regards admission to military hospitals.

(8) AERONAUTICS.

SUM VOTED BY CONGRESS.—Congress on the 3rd March, 1911, voted \$125,000 (about £25,000) for Army aviation work during the fiscal year 1911-12. Of this sum \$25,000 or about £5,000, was made available at once. This enabled the Signal Corps to purchase a small aeronautical equipment for the "Manœuvre Division" which was mobilized at San Antonio, Texas. This equipment was used to train officers and for actual reconnaissance work with the division from March to July, 1911.

ARMY AVIATION SCHOOL.—An Army Aviation School was established in June, 1911, at College Park, Md., some eight-and-a-half miles from Washington, for the training of specially selected officers in the military use of aeroplanes and in accessory subjects. On the 28th November this school was moved for the winter from College Park to Augusta, Ga.

AERONAUTICAL EQUIPMENT.—At the end of 1911 the aeronautical equipment of the Signal Corps consisted of six aeroplanes, three small captive balloons and the dirigible "Baldwin."

(9) RESERVES AND MOBILIZATION.

FIELD SUPPLY DEPÔTS.—The Secretary for War has approved of the following general plan for the establishment of depôts of reserve supplies for mobilization purposes:—

The United States has been divided into six districts with reference to the areas from which volunteers would be drawn. One supply depôt will be established in each district. No. 1 Field Depôt has already been established at Philadelphia. No. 2 Field Depôt will be at Jeffersonville, Ind., until appropriations are available to establish it at Atlanta, Ga. No. 3 Field Depôt will be at St. Louis, Mo. No. 4 Field Depôt will be at Omaha, Nebr. No. 5 Field Depôt will be at San Francisco, Cal. No. 6 Field Depôt will be in New England, probably at Springfield, Mass., or in the vicinity. A sufficient quantity of supplies will be accumulated to place at full war strength the entire Regular Army and the Organized Militia (some 228,000 men), and to keep them supplied for one year.

The supplies are to include only such articles as are not perishable and cannot readily be obtained in the open market.

ORDNANCE EQUIPMENT FOR MOBILIZATION.—The Ordnance Department has for some years past been working out a scheme for the equipment of the Field Armies of the United States on mobilization. Among other things a system of Division Field Ordnance Depôts was worked out for a Field Army of 450,000 men. The total number of these Division Field Ordnance Depôts is to be 23, and each is to have the tools, and ordnance stores and supplies for maintaining a complete division for six months. These Division Field Ordnance Depôts will eventually be combined with the Field Depôts described in the preceding paragraph. Sixteen of these Divisional Field Ordnance Depôts have now been established and equipped. Of the 264 field batteries required for this mobile army of 450,000 men the material for only 150 batteries is now in the possession of the Regular Army or Organized Militia, in Ordnance Establishments or under manufacture. There is a shortage of reserve ammunition for the Field Artillery, and the Secretary of War states that "there is not enough field artillery ammunition for the guns for a single engagement such as were frequent in the Manchurian War."

(10) MUSKETRY AND SMALL ARMS.

ELECTRICALLY OPERATED TARGETS FOR MUSKETRY.—Three different designs of electrically-operated targets, the Bremner, the Chevallier and the Self-Scoring, have been installed at the School of Musketry for test. So far the only report received is that on the Chevallier. The tests are said to have showed that this target is not sufficiently reliable to be considered, in its present state of development, as a proper substitute for the service targets now in use.

AUTOMATIC PISTOL.—The Colt Automatic Pistol, calibre .45, model of 1911, was officially adopted as the service weapon on the 29th March, 1911. It takes the place of the Colt revolver, calibre .38. An order has been placed with the Colt's Patent Fire Arms Manufacturing Company for a sufficient number

of the new pistols to equip the regular Army. Deliveries are to commence on the 22nd December, 1911, and final delivery is to be made not later than the 22nd May, 1913.

GRENADES.—Hand and rifle grenades have been completed, have passed a satisfactory test and have been issued at those places where they are most likely to be needed. A pamphlet has been prepared and issued containing a detailed description of the grenades with instructions for their use and for insuring the safety of those who handle and throw them.

AUTOMATIC MACHINE RIFLES.—The first lot of Benet Mercie machine rifles, calibre .300, model 1909, has been received, inspected and accepted. During the course of the inspection a very severe firing test was held which confirmed the previous results as to the excellence and durability of the material. The issue to all machine gun platoons of rifles with packs will be made in the near future. The design of a pack outfit for Benet Mercie machine rifles has been settled and sufficient packs for 325 machine gun platoons are under manufacture and should be delivered within the first six or eight months of 1912.

(II) MANŒUVRES AND TRAINING.

"MANŒUVRE DIVISION."—On the 6th March, 1911, orders were issued for the mobilization of a "Manœuvre Division" consisting of three Infantry Brigades, a Field Artillery Brigade and Independent Cavalry Brigade and the necessary auxiliary troops. On the same date orders were issued for the mobilization at Galveston, Texas, of 36 companies of the Coast Artillery Corps, to be organized into three provisional regiments of 12 companies each. This organization was called the First Separate Brigade. At the same time instructions were issued to the Commanding General, Department of California, to concentrate at San Diego, Cal., two regiments of infantry. He was also directed to assemble at the Presidio of San Francisco, Cal., a sufficient number of companies of the Coast Artillery Corps to make up one provisional regiment. The mobilization of this regiment, however, was never completed. During July and August one Cavalry regiment, two Field Artillery regiments, four Infantry regiments, three companies of Engineers, one company Signal Corps, two Field Hospitals and two Ambulance companies returned to their peace stations. On the 7th August, 1911, the "Manœuvre Division" was discontinued, and the remaining troops, *vis.*, company "L" Engineers, company "I" Signal Corps, 11th Cavalry, 10th, 17th and 28th Infantry were temporarily attached to the Department of Texas.

In September orders were given for the 10th Infantry to move to Panama, and in October the rest of the troops mentioned in the preceding paragraph were ordered back to their peace stations.

MILITIA TRAINING.—More than 1,000 officers of the Organized Militia served for periods of 14 days with the

"Manœuvre Division" at San Antonio, Tex. Twelve batteries of Militia Field Artillery were given instructions with the 5th Regular Field Artillery at Sparta, Wis. In July the mobile Militia of Massachusetts conducted a manœuvre campaign of 7 days under service conditions. The Secretary of War in his Annual Report states that a great improvement in efficiency was shown by this Militia as compared with the manœuvres of the same Militia two years ago.

(12) EDUCATION.

CHANGES IN THE SYLLABUS OF EXAMINATIONS.—Minor changes were introduced during the year into the syllabi of certain examinations. The object of the changes was to raise the standard of examination so as to hold out special inducements to graduates of Colleges and Universities, and at the same time to extend special privileges to graduates of Military Schools and Colleges of the various States and to members of the Organized Militia.

MOUNTED SERVICE SCHOOL.—The following change was introduced at the Mounted Service School, Fort Riley, Kansas, in March, 1911:—

The School for Field Officers was established as part of the Mounted Service School. The course of instruction lasts from the 1st April to the 15th June, and has for its aim the instruction of field officers in superior horsemanship and in the practice of bold riding.

THE ARMY STAFF COLLEGE.—(a) "Care of troops" no longer forms the fifth of the courses of study. It becomes a fifth sub-head of "Military Art," the first course of study.

(b) The third of the courses of study is now "Military Law" instead of "Law." "Constitutional Law" is no longer included in the course of study.

THE ARMY FIELD ENGINEER SCHOOL.—The courses of study, which formerly consisted of the following five departments:—

Military Art, Engineering, Law, Languages, "Care of Troops,"

now consist of the two following departments only:—

(1) *Military Engineering* comprising (a) Military Map making with special reference to large areas. (b) Organization, duties and equipment of engineer troops. (c) Field fortification including mining and demolitions. (d) Engineering works on lines of communications. (e) Castramentation.

(2) *Military Art*.—The study of this subject will be identical with that in force at the Army School of the Line, and will be conducted under the direction of the director and instructors at that School.

THE ARMY FIELD SERVICE AND CORRESPONDENCE SCHOOL FOR MEDICAL OFFICERS.—This School has been established at

Fort Leavenworth, Kansas, during the year as part of the Army Service Schools there. It consists of two parts: one, the Field Service School for Medical Officers, at which attendance in person for the pursuance of a graded course of study is required; the other, the Correspondence School, wherein answers and solutions to such questions and problems as may be sent to designated medical officers at their posts, are required. The course of instruction at the Field Service School for Medical Officers will cover a period of not less than six weeks between the 1st April and the 15th May each year.

SCHOOL OF FIRE FOR FIELD ARTILLERY.—A School of Fire for Field Artillery was established during the year at Fort Sill, Oklahoma. Four courses are laid down:—(a) for Captains and Lieutenants of Field Artillery and such officers of the infantry and cavalry as may be ordered to attend by the War Department. (b) For Field Officers of Field Artillery. (c) for N.C.O.'s of Field Artillery. (d) For officers of Field Artillery Organizations of the Organized Militia.

(13) DISCIPLINE.

DESERTION.—The campaign conducted in recent years against the crime of desertion has been eminently successful. As shown by the official returns the number of desertions from the Army during the fiscal year 1908-9 was 4,993; during the fiscal year 1909-10 the number was 3,464, and during the fiscal year 1910-11 the number was only 2,504. This shows a total reduction of 2,489 or practically 50 per cent. in the last two years. The desertion rate for the fiscal year was 2.28 per cent. of the whole number of enlisted men in service during the year. This is lower than the desertion rate has ever been during the last 90 years, with the single exception of the fiscal year 1897-8. The rate for the entire year in that case was reduced to 1.57 per cent. by reason of the increase in the Regular Army at the beginning of the war with Spain and the consequent influx of many thousands of new men during the last three months of the fiscal year.

MILITARY PRISONERS.—Important changes were made by War Department General Orders No. 49 of 10/4/11 and No. 78 of 12/6/11 in the treatment of military prisoners. Prisoners serving sentences of imprisonment may now work without an armed escort; they may be restored to duty on probation after serving one half of a sentence of ten days or more, and they can earn an abatement of their sentences on account of good conduct. The question is being considered of the adoption of a system by which soldiers guilty of purely military offences will be separated from those guilty of offences punishable under ordinary statute law. The proposal is to introduce a system of "Detention" and "Detention Barracks" similar to the system in force in the British Army.

COURTS MARTIAL.—During the last fiscal year 42 officers, five cadets, and 3,804 men were tried by General Court Martial

which corresponds to our G.C.M. and D.C.M. This total is smaller than for any year since the Spanish War and shows a decrease of 1,355 as compared with the previous fiscal year. There were 32,288 trials by minor courts, which correspond to our C.O.'s awards and R.C.M.; this total shows a decrease of 9,333 trials compared with the previous year. This substantial reduction has been accomplished without relaxing discipline. The chief reason for this reduction is the fact that the company commanders are dealing with more cases under paragraph 968 U.S. Army Regulations. Another possible contributory cause is the fact that some 15,000 troops were withdrawn from their routine duties at military posts, and concentrated for some four or five months in the "Manœuvre Division" and First Separate Brigade. Their constant employment made it easier to maintain discipline without so frequent a resort to the summary courts.

(14) RECRUITING.

RECRUITS.—Orders issued on the 28th March, 1911, materially increased the authorized enlisted strength of units serving in the "Manœuvre Division" and on the Mexican border. In order to fill these units to the newly authorized strength the sending of recruits to other units was virtually discontinued, and recruits as far as practicable were sent to units with an increased authorized strength. On the 2nd June, 1911, the Secretary for War directed that the assignment of recruits should resume its normal course.

The following are the figures for the year ending the 30th June, 1911:—

¹ Total original enlistments	...	...	22,444
¹ Total re-enlistments	...	...	15,597
Percentage of rejections	...	...	76
Percentage American born	...	...	nearly 89
Age of majority of recruits, 21 to 25 years			

A study is now being made of a method of assigning recruits, which will result in the assignment of recruits to organizations at regular intervals. This is most important, as it will enable systematic progressive instruction to be carried on throughout the Army. There seems to be, in the opinion of the Chief of Staff, no reason why this should not be done without unduly congesting the recruiting depôts or in any way increasing the cost.

(15) HORSES.

REMOUNT DEPÔT.—5,000 acres of land in the vicinity of Front Royal, Virginia, were purchased for the Front Royal Remount Depôt. The construction of the necessary buildings to provide stabling and other accommodation is now under consideration.

¹ Exclusive of the Philippine Scouts.

EXPORT OF HORSES.—As a result of the recent State legislation against horse racing, there has been and continues to be an increasing shipment out of the country of the best thoroughbred horses. In some cases these shipments consist of entire studs of thoroughbreds, and the effect on the breeding of horses in the United States cannot fail to be disastrous. The extent to which the loss of thoroughbred horses is now taking place is reducing the source from which the Army can secure proper remounts, and it is likely to cause deterioration in the breed of horses in the United States.

(16) PERMANENT COMMUNICATIONS.

PANAMA CANAL.—The progress of the work of constructing the Panama Canal continues to be satisfactory. The concrete in the great locks at Gatun will all have been laid by the 1st January, 1913. The Pedro Miguel and Miraflores locks will, it is expected, be completed by the 1st June, 1913. The excavation of the Culebra Cut will be completed by the 1st July, 1913, unless the earth slides are much in excess of estimates. The President in his message to Congress on the 21st December, 1911, says that there is every reason to believe that the canal will be completed as early as the 1st July, 1913. This is 18 months earlier than the original estimate.

The fortification of the Canal has been definitely decided upon and has been commenced. £600,000 was voted by Congress for this purpose during the fiscal year 1910-11. One regiment of infantry has already been sent to the Canal Zone, and the Zone itself has been made part of the Eastern Territorial Division. A battalion of U.S. Marines is also quartered at Camp Elliot in the Canal Zone.

The Chief of Staff in his annual report for 1911 advocates the assignment of the following permanent force to the Canal Zone:—

- Twelve companies of Coast Artillery.
- Four regiments of Infantry (at full strength).
- One battalion of Field Artillery.
- One squadron Cavalry.

besides auxiliary troops.

FORTRESSES AND DEFENCES.

CONSTRUCTION WORK.—No additional emplacements or armaments were provided during the year 1911 for the continental United States. The appropriations were confined to sums for the accumulation of accessories for the armament; that is to say ammunition, searchlights, fire control, and power plant. Marked progress was made in the construction of the coast defences for Manila and Subic Bays, Honolulu, and Pearl Harbour; and the appropriations in the Fortifications Act of March 4th, 1911, will leave comparatively little to be appropriated in future to complete the defences of these places.

THE SUPPLY OF AMMUNITION AND MOTOR TRANSPORT.

By MAJOR H. DE PREE, R.F.A.

"WAR Establishments," published with Army Orders in February, 1912, have sanctioned the conversion of the old divisional ammunition column into a divisional ammunition park, the transport of which is to be motor lorries. The first step has thus been taken in what will probably revolutionize the supply of ammunition in European war.

This step is a most important one, and it may be said, truly, that it goes as far as would be safe in our present state of knowledge of motor transport for the supply of armies. Still, as it is the first step, and as the subject is a new one, it may be permissible to discuss what the next step is likely to be, and to draw attention to some of the principles which may probably direct it.

By the introduction of motor transport the whole conception of the supply of ammunition has been changed. Under the old system an army had to depend on a series of reserves carried with it or close behind it. The probability was that for any given battle it would have to depend on these alone, and that after the battle it might take some time to replenish them. It is fairly certain, moreover, that these movable reserves would not have been sufficient to allow of modern guns being used to their full capacity.

By means of motor transport, on the other hand, the large reserves held on the railway will be made available during the course of a serious engagement. The general conception then of the supply of ammunition in the future will be, not a series of reserves, but a reservoir established on a road as near the firing line as convenient, fed by a stream of motor transport having its source at the railway. Between the reservoir and the troops will ply horsed vehicles capable of moving freely across country. With a sufficiently liberal reserve of ammunition on the railway, and a good system of rapidly transporting it to the firing line, we may thus in future hope to be able to use our quick-firing guns to their full capacity. The importance of this can hardly be overrated, when we remember that the power of artillery is more truly judged by the number of shell that it is able to fire than by the number of its guns.

Having put this ideal before ourselves, we will briefly describe the system of ammunition supply introduced by the new war establishments. We will then venture to make one or two suggestions as to where it may possibly be modified in the future. Experience will show whether these or any modifica-

tions are desirable. But in any case no harm can be done by considering them and trying the new system with our minds fixed on further improvements.

PRESENT SYSTEM OF AMMUNITION SUPPLY.

(a). The regimental reserves and the ammunition carried by the troops are the same as they have been in the past.

(b). The first change is in the brigade ammunition columns. The large cumbersome brigade ammunition column has been split up and the new one consists only of the 18 limbered artillery wagons, the seven small arm-ammunition carts and three general service wagons (for small arm-ammunition) of the old column. Its length on the road is thus reduced from 1,100 yards to about 550.

(c). The whole of the rest of the general service wagons of the four brigade and the heavy battery ammunition columns (carrying gun and small arm-ammunition) have been grouped as a divisional ammunition column. These will be under the orders of the divisional artillery commander, and will normally march three to four miles in rear of the main body of the division.¹ In action they will be about two miles in rear of brigade ammunition columns.

(d). The old divisional ammunition columns have been turned into divisional ammunition parks, the ammunition of which will be carried in three-ton motor lorries, capable of moving at twelve miles an hour. These will be under the Inspector-General of Communications, who will retain them in suitable positions in rear, till he receives instructions from general headquarters to push them up into touch with divisional ammunition columns at the beginning of an engagement. These parks will apparently always remain under the orders of the Inspector-General of Communications.

POSSIBLE MODIFICATIONS OF THE SYSTEM.

(a) Divisional Ammunition Column.

The first thought to strike any person considering this organization would probably be "Is there any chance of improving the divisional ammunition column?" As constituted at present it consists of general service wagons horsed with animals collected on mobilization. It will be slow moving and its vehicles will be of little use off the road. It will be over 2,000 yards long, and will encumber the division if it marches with it. It will be even more of an encumbrance if it marches three or four miles in rear, as it will block the roads in rear for an hour or two after the division gets in, and being some distance from the division it will take time for messages or

¹ Field Artillery Training. § 230.

orders to reach it. In its present form, therefore, it seems to possess few merits, and can only be a makeshift till we are more sure of motor transport. The question then arises—if motor transport is a success, which it is pretty certain to be, what are we to do with the divisional ammunition column?

1. We can replace the horsed vehicles by light motor lorries capable of going over the same bridges as field guns, and capable of going up bad narrow lanes.

2. We can put the ammunition into three-ton motor lorries similar to the ammunition park, and relegate it back to the latter, putting it under the Inspector-General of Communications.

3. We can put the ammunition into three-ton motor lorries, join the ammunition park to the divisional ammunition column under the orders of the Divisional General, and abolish the ammunition park. The divisional ammunition column would then march closed up to its division each day. In this case it may be possible to reduce the amount of ammunition carried on wheels, as it will be nearer to the troops, and the motor lorries will be able to return sooner to the railway to replenish their load.

The first course has many advantages, but it perpetuates one of the defects of the present system, which is the large number of different lines in which the ammunition is carried. With such a number some are likely to go astray. Then if one considers the number of loadings and unloadings which a round of gun ammunition will undergo in its transit from the railway truck to the gun, it becomes apparent that the stream to which we compared the supply of ammunition will become sluggish, to say the least of it. While the manual labour involved in the transfers can only be adequately appreciated by those who have had the shifting of a large amount of ammunition.

The second course reduces the number of lines of reserves and thus simplifies matters. It also places all motor transport under the Inspector-General of Communications, and tends to uniformity of system as between the supply of rations and of ammunition. It is very doubtful, however, whether it would be safe to put the main reserve of ammunition so far to the rear, and only leave such a slender amount with the division. In theory it could always be pushed up by general headquarters; in anticipation of requirements. But in practice we know that units separated by a long distance are apt to miss one another. Unforeseen events may arise and an unsuspected encounter with the enemy may take place. Lines of telegraph may get blocked or messages miscarry, and at a great distance such mishaps would be hard to put right. There might even be delay in disentangling the different motor columns and sending them on their way. The Inspector-General would have six of these columns of a hundred motor lorries each massed under his command, and we do not know yet how he would move or park such a number. The danger of placing the main reserve so far to the rear

therefore appears to outweigh the advantages of this plan. We are left with the third plan. The main disadvantage of this is, that if the columns march under the divisions they will tend to congest the roads in rear of them, and if the army is marching in a concentrated formation they may block one another or the march of other divisions. Another disadvantage is that full use is not made of the power of motor transport to cover great distances by keeping it right back. In the opinion of the writer, however, it is not the swiftly moving motor convoys which will block the roads, but the long lines of horsed wagons, and these disadvantages are not so great as that of having the ammunition separated from the divisions. This plan will therefore be considered in greater detail, and an endeavour will be made to show how the disadvantages can be minimized.

(b) Brigade Ammunition Columns.

We have considered a possible improvement for the divisional ammunition column. We will now consider a similar possibility in the case of the brigade ammunition columns.

Under the old system, when these columns had a length of 1,100 yards, the Field Service Regulations laid down that they should march grouped in rear of the fighting troops of their division. Now that they have been reduced by half, however, the tendency probably will be to keep them more closely associated with their brigades. This tendency will be strengthened by the practice of billeting in depth on the march, which is being more extensively employed at the present time.

The question then arises, would it not be better to carry this idea a step farther, and turn them into a third line of wagons with the batteries, after the manner of the French. This would have the advantages that four less fresh units would have to be mobilized in each division, and if a battery were detached it would take with it all its immediate reserve of ammunition.

If an engagement were imminent all the third line wagons of a brigade would be grouped in rear of it (they would be about 360 yards in length). In action also they would be in close touch with it, as they would form the aforementioned reservoir placed on a road, which the motor transport would keep filled. At night they could join the other wagons and limbers of their battery. They would thus always be near their own brigades and their rationing would be an easy matter.

This organization would leave the small arm ammunition in the brigade ammunition columns unprovided for, and a means of carrying it must therefore be devised. It becomes a question whether it should be formed into three small infantry brigade reserves or into one divisional reserve. On the whole the latter seems the best solution, as one of the infantry brigades would frequently be in reserve and would probably not require to replace its ammunition. The whole would then be available for any part of the division which might require it.

It is proposed, therefore, that this small arm ammunition should be formed into a mobile reserve divided into three sections and consisting of S.A.A. carts. It would be under the hand of the G.O.C. Division, and would be used as one or more reservoirs placed on the road in the same manner as the third line wagons of batteries.

OUTLINE OF A PROPOSED ORGANIZATION.

The modification which we have suggested would result in an organization, the general conception of which is as follows :

1. A reserve of ammunition immediately in touch with the division, sufficient for the first few hours of an engagement. This to be carried on vehicles, which can move across country, and can be used for replenishing the ammunition with the fighting line from the motor transport.
2. A swiftly moving convoy of motor lorries which should be able to come up into close touch with the division within three or four hours of the artillery getting into action if there is only one division on the road or seven to ten hours if there are two.
3. Trucks of ammunition held ready on the railway for immediate use.

The actual reserves would then be in the shape of :—

- (a) Regimental Reserves.
- (b) 1. Artillery Brigade Reserve.
2. Divisional S.A.A. Reserve.
- (c) Divisional Ammunition Column (Motor).
- (d) Reserves held ready for instant use on the railway.

To consider these formations in detail :—

(a) Regimental Reserves would remain as at present, firing battery and first line wagons with the artillery, and regimental reserves with the other arms.

(b) 1. The Artillery Brigade Reserve would consist of the 18 limbered wagons at present with the brigade ammunition column. These would be split up among the batteries of the brigade for mobilization and administration, and would march with them when the chances of an encounter with the enemy were small. But as soon as an engagement appeared likely they would be grouped in rear of their brigade. Their command when grouped would be exercised by a captain, assisted by a subaltern specially attached to the brigade staff for the purpose, together with a Q.M.S. and clerk to check the expenditure of ammunition.

2. The Divisional S.A.A. Reserve would be absolutely dissociated from the Artillery Brigade Reserve, and would be under the direct orders of the G.O.C. Division. It would consist of 30 S.A.A. carts. These would be divided into three self-contained sections corresponding with the three Infantry Brigades, and would each be under an officer.

This line would correspond with the Artillery Brigade Reserve, and in the event of an engagement both would be sent to refilling points on roads as near as possible to the troops whom they were supporting. They would then work backwards and forwards between the lorries, which would come to these points, and the regimental reserves.

(c) The divisional ammunition column would carry all the ammunition which the park does at present, and in addition would take such a balance of ammunition, both artillery and small arm, left over from the present divisional ammunition column, as may be considered advisable.

This column would bivouac or billet each night immediately in the rear of its division, but would not march with it. If there were only one division on the road it would move in time to get into its new quarters shortly after the rear of the column. If there were two divisions on the road it would move after the second division had got into its new quarters. The hour of moving would thus depend on the hour at which the roads were clear, and might possibly be at night. The march in any case would not be a serious affair for it. At twelve miles an hour it would only take about one-and-a-half hours to do the fifteen miles, which is the average march of a division.

(d) The reserves on the railway would consist of trucks loaded with ammunition which would be held ready at the regulating station. As soon as battle was joined they would be moved to the most convenient railhead or railheads so as to be immediately in a position to issue ammunition to the lorries of the divisional ammunition column.

AMOUNT OF AMMUNITION REQUIRED IN THE FIELD.

We will now endeavour to form an estimate of the amount of ammunition which it would be advisable to provide for the proposed organization. For this purpose we will compare the amount of ammunition carried by ourselves with that carried by France and Germany, and also examine some statistics as to what has recently been expended in war. The case of the light Q.F. guns will be taken, as they probably expend most ammunition.

A comparison of the rounds per Q.F. gun carried by England, France, and Germany gives the following table:—

	<i>Britain.</i>	<i>France.</i>	<i>Germany.</i>
Close up to {	With Battery 176	With Battery 312	With Battery 126
the Battery {	Bde. Amn. Col. 76	—	Light Amn. Col. 120
	252	312	246
	Divl. Amn. Col. 126		
	Ammunition Park 150	Amn. Col. ... 267	Amn. Col. ... 140
Total in front of Adv. Dépôt	528	579	386

From this it will be seen that we carry considerably more ammunition than the Germans; whilst we do not compare un-

favourably with the French, when it is remembered that we have more guns than the French, viz., 76 guns per division to their 60.

It is evident, therefore, from this point of view, that we do not require to carry more in front of railhead than is carried at present.

So much for a comparison between the three armies in which we are most closely interested. We will now consider very briefly how these amounts compare with what is said to have been expended recently in war, and what well-known authorities consider is a proper reserve of ammunition. At Liao-yang the Russian Artillery in the nine days' fighting fired 332 rounds per gun, or 38 rounds a day, but many guns were not heavily engaged. At Mukden, General Rennenkampf's five field batteries fired 613 rounds per gun in eleven days, or 57 rounds a gun per day. On the other hand, 36 guns of the 35th Russian division fired 364 rounds per gun one day and 260 rounds per gun another day at the battle of the Sha-ho. Again, the guns of the 1st and 3rd Siberian Corps fired 422 rounds per gun per day at Liao-yang on August 30th and 31st. This last is believed to be the greatest average ever fired in one day, but it is an exceptional case in which guns in a specially prepared defensive position were meeting heavy frontal attacks all day. These records were made by batteries using the best equipment which has been used in a great war up to the present, but it is certain that they will be exceeded in future by artillery using the highest class equipments.

Before the Manchurian war the Russians thought that 500 rounds a gun was enough for all requirements; but after Liao-yang General Kuropatkin is said to have come to the conclusion that 1,000 rounds per gun in the theatre of war is necessary. It is not clear whether he means in the neighbourhood of the troops or along the lines of communication as well. General Langlois has estimated that at the beginning of a campaign 3,000 rounds per gun should be available, including all the supplies in rear as far as the national arsenals.

From these data we may get an idea of the number of rounds it will be advisable to carry under the proposed conditions. The proposed organization requires that the troops should have with them in the first instance enough ammunition for three to five hours' fighting if there is one division only on a single road, or seven to ten hours if there are two. At the end of this time the motor lorries would be in touch with them, busy replenishing ammunition. For these first three to ten hours the battery wagons and brigade reserves, which give an allowance of 252 rounds per gun, would be available. This may not seem sufficient in the extreme case of ten hours, but it is unlikely that the whole of the guns will be put into action from the first. So the amount should be sufficient even in this case, and should be ample in ordinary cases.

Immediately after the lorries had got to work the empty ones would begin returning to the railway. The limit of the radius of action from the railway has been laid down as 45 miles. The double journey at 12 miles an hour should therefore at most take eight hours. Fresh supplies of ammunition should thus be arriving from the railway within 24 hours from the beginning of the battle. We have therefore to carry sufficient for this time in the field reserves. To estimate this, we know that the greatest expenditure in a day for any considerable part of an army in Manchuria was 422 rounds per gun. If therefore we allow this for the whole of the guns, we should be within the mark for modern requirements. This number could be obtained by carrying in the divisional ammunition column 180 rounds per gun, or one-fifth more than that now carried in the divisional ammunition park. This would give 432 rounds per gun in the field reserves.

In the case of a second day's fighting, which is probable in a modern battle, 430 more rounds, the freshly brought up contents of the field reserves, would again be used up. This means that we must have 860 rounds ready on the railway to replenish immediately that used up from the field reserves and railhead, and the same amount at the base as a final reserve.

From these calculations we get an allowance of 2,580 rounds per gun, which comes pretty near to General Langlois' proposal of "3,000 rounds per gun in all supplies as far as the National Arsenals."

DISTRIBUTION OF AMMUNITION.

Calculations based on the principles in the previous section would give the following tables of the distribution of ammunition for the different arms.

Distribution of Ammunition.

ARTILLERY (per gun).

Description of Gun.	Battery.	Brigade Ammun. Reserve.	Divisional Ammun. Col.	Total in front of L. of C.	Total in the Field.	In Arsenals at Home.	Total.
13 Pr. Q.F. ...	176	76	180	432	2,500	500	3,000
18 " " ...	176	76	180	432	2,500	500	3,000
Fd. Howitzer ...	108	48	100	256	1,500	250	1,750
60 Pr. ...	80	40	90	280	1,200	200	1,400

MEN (per rifle).

Service.	With Unit.		Divisional S.A.A.	Divisional Ammun. Col.	Total in front of L. of C.
	On Soldier.	Regimental Reserve.			
Cavalry.. ...	100	100	50	120	370
Infantry ...	150	100	50	120	420

ESTABLISHMENT.

It is not possible here to go closely into the war establishments of the new units, but it is possible to give an idea how they would differ from the present ones.

1. Artillery Brigade Reserves. For administration these would form part of the batteries. This will entail an increase to the war establishment of each battery of six wagons, eight N.C.O.'s, including one sergeant and coverers (to take charge of the wagons in the field), and one shoeing smith, 24 gunners, 20 drivers and 46 horses. The spare gunners to replace casualties would be carried on these wagons.

To take charge of them when grouped in action each brigade headquarters would require to be increased by two officers, one Q.M.S., one clerk, two bicycle orderlies, two signallers and eight horses.

2. The Divisional S.A.A. Reserve is to be a separate unit formed on mobilization. The officers and men would come from the infantry. The drivers and horses would be supplied by the A.S.C. It would consist of four officers, eight mounted N.C.O.'s, 30 S.A.A. carts, one G.S. wagon for kits, 34 drivers, 40 private soldiers and about 80 horses.

3. As regards the divisional ammunition column it has been proposed that the amount of ammunition carried should be one and a fifth times that now carried by the divisional ammunition park. This would result in a unit similar to the divisional ammunition park with an increase of lorries from 100 to something between 120 and 125, and a proportional increase in the personnel.

The command of the new divisional ammunition column would be exercised by the same officers as in the case of the present divisional ammunition column, with the exception that an officer of the A.S.C. would be attached to headquarters and to each section to superintend the mechanical transport. The establishment of officers is high. But on the skilful handling of this column will depend the expeditious supply of the enormous amount of ammunition required in a modern battle. To carry out its duties efficiently the column will often have to be scattered, and it will require great intelligence on occasions to find the troops for whom supplies of ammunition are destined, and to get fresh supplies from the railway. As it is important that the command should be in the hands of officers who understand the requirements of the arms which they are supplying, it is suggested that the small arm section might be officered by infantry officers.

The following table gives a proposed sub-division of the column, with the duties which the different sections will perform :—

	Duties.	Officers.	Lorries.	Motor Cars. (for Officers)
H.Q. Sec. ...	Command Repairs. Petrol Supply.	1 Lt.-Col. R.F.A. 1 Adj. " 1 Capt. A.S.C.	8 (including 2 repair lorries, 3 tank lorries and spare).	1 and 4 motor bicycles (for orderlies).
1st Sec. ...	18 pr. Q.F. Ammunition.	1 Capt. R.F.A. 2 Lts. " 1 Lt. A.S.C.	30 (including 1 spare).	1 and 3 bicycles (for orderlies.)
2nd Sec. ...	do.	do.	do.	do.
3rd Sec. ...	Howitzer and 60 pr. Ammun.	do.	22 (including 1 spare).	do.
4th Sec. ...	S.A.A.	1 Capt. Inf. 3 Lts. " 1 " A.S.C.	31 (including 1 spare).	do.
Total ...		20 Officers.	121 lorries.	5 motor cars.

The total establishment would thus work out at 121 lorries, five motors, four motor and twelve ordinary bicycles, and, judging from the present war establishment of an ammunition park, about 570 men.

We thus get an increase of about 100 men and 21 motor lorries against a saving of 500 men, 700 horses and 100 vehicles, gained by the abolition of the old divisional ammunition column. Whilst there would be an increase of about 150 men in the brigade ammunition reserves, caused by more spare gunners being carried in them. The whole organization would therefore result in a saving of about 250 men and 700 horses for each division, a very considerable number when the whole Expeditionary Force is taken into account.

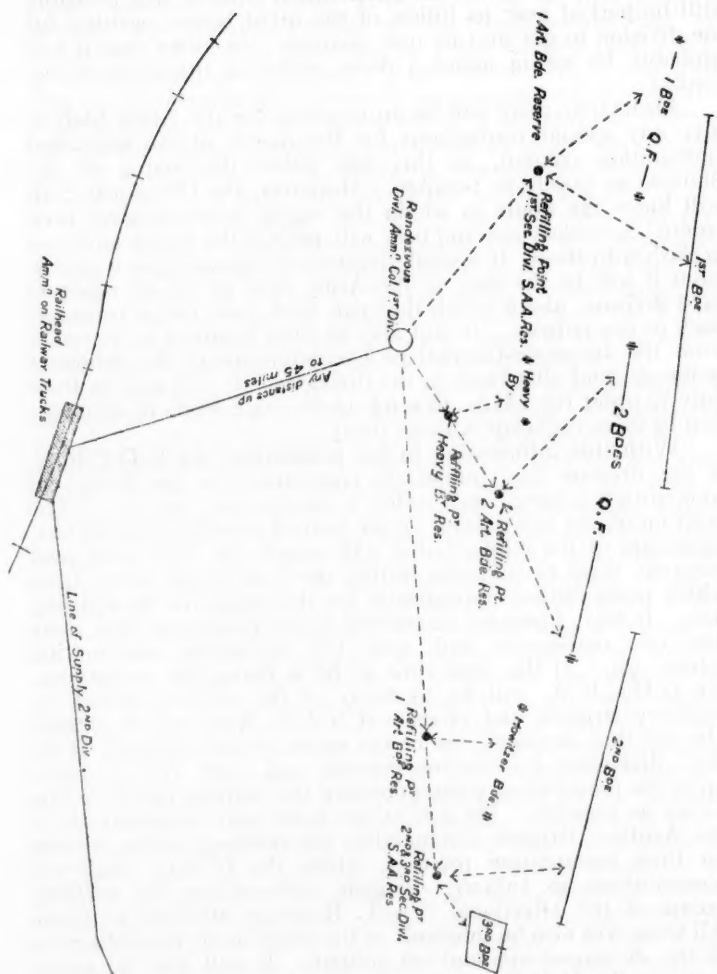
THE WORKING OF THE ORGANIZATION.

(See Diagram.)

It has been stated already that the normal procedure will be for the divisional ammunition column to bivouac or billet each night close up behind the division. It is very important that the bivouac should be near the division, so that the Divisional General may be in close touch with it, and also because the march of the divisional ammunition column to its rendezvous, in case of battle, should be as short as possible. The work of the men of the column will only be beginning when they reach the rendezvous, and it is desirable that they should arrive as fresh as possible, because from this time their labours will be incessant, plying between the brigade ammunition reserves and the railway.

If the army is moving forward from its bivouacs to the attack, the G.O.C. Division will probably order the divisional

DIAGRAM ILLUSTRATING SUPPLY OF AMMUNITION TO A DIVISION.



ammunition column to remain parked till the situation has developed, and till he knows where the ammunition is required. If the meeting with the enemy is unexpected and an encounter battle results, the divisional ammunition column will probably still be parked near its billets of the night before, waiting for the division to get into its new quarters. In either case it will probably be within about a dozen miles of the scene of the conflict.

Ordinarily there will be no necessity for the Army Staff to give any special instructions for the march of the divisional ammunition column, as this will follow the march of the division as closely as possible. Moreover, the Divisional Staff will know the hours at which the supply columns have been ordered to rendezvous, and they will arrange the march so as not to clash with them. If several divisions are operating on a narrow front it will be the duty of the Army Staff to tell off roads to each division, along which they can work their motor transport back to the railway. It will also be their business to ascertain from the Inspector-General of Communications the proposed railheads, and allot them to the divisions. It will also be their duty to order the I.G.C. to send up the train loads of ammunition to these railheads without delay.

With this information in his possession, the G.O.C.R.A. of the division (the immediate commander of the divisional ammunition column) will order a rendezvous for it. The position of this will depend on the tactical situation and the configuration of the roads, but it will usually be near some road junction, three to six miles behind the front of the army, from which roads radiate conveniently for the supply of the fighting line. It may, however, sometimes be convenient to have more than one rendezvous and split the divisional ammunition column up. At the same time as he is fixing the rendezvous, the G.O.C.R.A. will fix as many of the refilling points for Artillery Brigade and Divisional S.A.A. Reserves as he can. He will then despatch one of his motor cyclist orderlies to the O.C. divisional ammunition column and order him to move up to the rendezvous, communicating the refilling points to him as far as possible. He will at the same time communicate to the Artillery Brigade commanders the refilling points selected for their ammunition reserves, whilst the Q.M.G. Staff will communicate to Infantry Brigade commanders the refilling points of the Divisional S.A.A. Reserves attached to them. All these will also be informed of the position of the rendezvous of the divisional ammunition column. It will also be necessary for the Q.M.G. Staff to communicate with the field ambulances and both sections of the train, and order them to clear the road for the divisional ammunition column.

With reasonable luck if there is only one division on the road the divisional ammunition column should reach the rendezvous within three to five hours of the issue of these orders as the division will have been got off the road and

into fighting formation by this time. Meanwhile officers commanding Artillery Brigade and Divisional S.A.A. Reserves will have moved their commands to the refilling points selected for them, which will be on the road as near as the situation permits to the troops whom they are supplying. It will be necessary for these refilling points to be at a cross road or some other point where a lorry can turn. The commanders of the reserves of ammunition will also by this time have sent back their bicycle orderlies to get touch with the ammunition column, possibly with orders as to the first consignment of ammunition. The refilling points will now be some one to two miles from the front, whilst the rendezvous will be two to four miles from these. In connection with these distances from the front, it should be remembered that it will be possible to bring units of motor transport nearer to the front than was safe in the case of the former horsed units, without danger of blocking the roads in the event of retreat. For if the lorries have a place to turn and can get away ahead of the troops by ever so little, they will soon clear the front of the army.

As soon as a wagon or S.A.A. cart at the front is empty it will at once be sent to the Artillery Brigade or Divisional S.A.A. Reserve to be replaced, or a fresh wagon or cart will be ordered up from the latter to replenish it, as may be most convenient. The officer commanding the section of the reserve concerned will take immediate steps to fill up the empty wagon or cart, by ordering up a lorry from the divisional ammunition column, or he may have ordered up one or more of these already in anticipation, if the engagement appears to be a serious one. As soon as a lorry is empty it will return to the divisional ammunition column. The normal plan will thus be for lorries to be sent up from the divisional ammunition column rendezvous to the refilling points. If, however, the latter are on narrow lanes impracticable for motor transport, the empty limbered wagons may be sent back from the refilling points to the rendezvous, to be filled there. When a certain number of empty lorries have been collected at the rendezvous from different refilling points, they will be despatched to the railhead under an officer, where they will be loaded from the railway by gangs of civilian labourers, and return as soon as possible to the rendezvous. By this means, if the railhead is within 50 miles of the battlefield it should be possible to keep up a continuous stream of ammunition from the railway to the fighting line, only limited by the supplies of the railway. In rear of the rendezvous the lorries will be under the I.G.C., and it may be necessary for him to allot hours at the railhead for the different divisions to load ammunition, or otherwise to regulate the traffic.

So far, mention has only been made of the simpler case when one division is marching on a road. When there is a second division on the same road, it will usually be necessary for both the divisional ammunition columns to move and bivouac in rear of it and to remain parked, till the fighting part

of this division has been moved off the road into action, or into a position of readiness. A division is about 12 miles long, and this may cause a delay of four to five hours, preventing the ammunition column of the leading division from coming up for eight to ten hours. If there is a longer delay than this and the rear division is standing on the road waiting for orders, it may be necessary to request its commander to let the ammunition column past. This might be difficult in an enclosed country with narrow lanes, but on the Continent, where troops can move off the roads at most places, there should be little trouble about it.

The actual passage of the ammunition column would not be a very long business. We will consider how long this should take, theoretically. The distance which will have to be allowed between the lorries will depend on whether the roads are dusty or slippery. If they are in good order, probably ten yards between carriages would be sufficient. Therefore allowing 20 yards for each vehicle, including the interval, the column would take 2,400 yards, or about one-and-a-half miles. At this interval it would take only seven to eight minutes to pass a point at twelve miles an hour. In any case it would not take much more than a quarter of an hour. To clear the whole length of the division on the road would thus take about an hour. Practically, in a narrow road, it might take longer than this, as there would always be a chance of accidents, and the road getting blocked.

It has been said that normally both divisional ammunition columns will bivouac in rear of the rear division. Cases may occur, however, in which there may be a particularly suitable place for one to park in the area of the leading division. Such a case would be afforded by a large town, where the motor lorries could be parked in side streets or market squares. In such a case, if an engagement seemed likely, the leading divisional ammunition column might conveniently be brought up to its own division during the night.

AMMUNITION SUPPLY OF THE CAVALRY DIVISION AND ARMY TROOPS.

So far we have only discussed the ammunition supply of a division. There is no space to consider that of the Cavalry Division and Army Troops in similar detail. It will be enough to say that the arrangements for them will be on the same principles, and that a divisional ammunition column will have to be provided for each. The manœuvring of these will frequently be more difficult than that of the divisional ammunition columns. It is probable that they will frequently have to make use of night so as to keep ahead of the divisions without interfering with their march.

ADVANTAGES AND DISADVANTAGES OF THE SYSTEM.

Having now considered a system of ammunition supply, we will proceed to review its advantages and disadvantages.

As regards mobilization the proposed scheme appears undoubtedly better. First, 700 horses and 250 men are saved in each division. Then, instead of four brigade ammunition columns having to be improvized on mobilization, we only have the small Divisional S.A.A. Reserve. As regards the artillery we simply have the increase of one wagon and a few horses and men to each sub-section of a battery, which is a strong and efficient nucleus to build on.

It may possibly be considered a disadvantage that the Brigade Ammunition Reserves are no longer separate units with their own baggage and supplies. But on the other hand, their duties bring them into close touch with the wagon lines of the batteries, and it should be easy for them to join the latter in their bivouacs at night. If this is granted, it is more economical to administer them as part of the batteries than as separate units. Because the battery officers can supervise them, and two officers from the Brigade Staff should be able to control them in action.

As regards the ammunition carried, it is somewhat less than at present. The reserve actually with the troops will be diminished by nearly one-third, *e.g.*, field guns will only have 250 rounds instead of 378. To counteract this we hope to bring up the large supply in the Divisional Ammunition Column quicker. If we fail in this we shall undoubtedly be at a disadvantage. If, on the other hand, we get it up quickly, which we should be able to do by good arrangement, we shall be very much better off than before, because we shall have, in addition to the supply which it carries, the means of getting up the large supplies on the lines of communication.

The divisional ammunition column will be far more efficient than formerly. From being one of the least mobile units of the division it will become, within its limitations, more mobile than the fighting part of the division itself.

At a pinch it will be possible to carry out the ammunition supply of the artillery by means of two lines of wagons, and the motor transport. The men and horses of the third line thus become a reserve in case of heavy casualties.

It is an undoubted disadvantage that the system of supply of ammunition is different from that of rations, but the reasons for recommending this are strong and have already been discussed.

We will now state what are the two really serious disadvantages to the proposed system of ammunition supply. They are :—

First, that a larger proportion of the ammunition has to be brought up from some distance in rear, along roads that are liable to be blocked.

Second, that if for some reason the mechanical transport breaks down, we are in a very serious position.

As regards the first. The more we reduce horse transport with our army, the less will the roads be blocked in rear. A smaller number of motor vehicles moving at a fast pace will not block the roads to anything like the same extent as long columns of horse wagons trailing along for the greater part of the day. Besides this it will be our duty to minimize blocks as far as possible by proper allotment of roads, good march discipline, and good staff work generally. When we have had some experience of this new mode of transport, and understand better the points to which attention should be directed, it may be hoped that we shall get our supplies up with speed and certainty.

As regards the second. Excepting the failure of the supply of petrol, and the destruction of road bridges, there appears to be no other cause which can result in a total breakdown of motor transport. The insuring of a proper supply of petrol is a national almost more than a military affair.

The destruction of road bridges by the enemy will undoubtedly be a more serious matter than formerly. But it will be the duty of the Royal Engineers in their preparations for mending them to arrange for their repairs to be normally capable of taking heavy motor transport. On the speed with which they carry out their repairs will frequently depend the mobility of the army.

Hilly country, bad weather or snow may delay the motor columns, but if the lorries are not overloaded, they will probably have less effect on them than on horse transport.

We shall be more dependent than ever on railways; but on the other hand, we have a radius of action of fifty miles from the railway, which gives time for repairs to it to be completed.

Such are the chief advantages and disadvantages. There is one thing certain, however, that, whatever the disadvantages of a more extended use of motor transport may be, we shall have to face them, and make the best of them in order to gain the enormous advantages which it confers. Motor transport skilfully used gives the prospect of being able to supply a continuous stream of ammunition to the fighting line during a protracted action. No other real solution has ever been offered of the problem of ammunition supply to modern quick-firing guns, and the present article is a contribution put forward with all diffidence towards the solution of this great problem.

NOTE ON THE HANDLING OF SHIPS IN DIVISIONS.

By VICE-ADMIRAL GASCHARD, of the French Navy.

Translated from the *Revue Maritime*, and published by kind permission of the French Ministry of Marine and of the Author.

THE CO-EFFICIENT OF INERTIA.

OWING to the continual increase in the displacement of men-of-war the problem of manœuvring in close formation becomes more and more difficult as time goes on; and yet an Admiral will never willingly consent to an increase in the distance between the units in line, because the necessity for rapidly opposing to the enemy the greatest possible number of ships within firing range is as pressing as ever. Without minimizing the many disadvantages of irregular formation it can be readily admitted that, during an action, keeping station may become a secondary consideration, but, in any case, the evolutions of closing and engaging must be very precisely carried out in order to retain their maximum effect. The opening of the Battle of Tsushima is instructive in this respect. Nothing is therefore more justifiable on the part of Commanders-in-Chief than the very great attention paid to practising correct formation.

The investigation of the "Co-efficient of Inertia" aims at formulating a few extremely simple rules, which will enable the necessary variations of speed when taking up a predetermined position to be carried out without hesitation.

But before commencing this investigation, and although it is independent of the methods adopted for arriving at the various formations specified in the Signal Book, I should like to state the opinion which I have formed regarding the somewhat drastic substitution in our 1910 Signal Books of the "Formation" movements for "Evolution" movements as understood in the 1892 Signal Book.

The definitions have not changed. To-day, as in 1892, by "Evolutions" is meant "*controlled exercises in which each Division of ships has a predetermined route and speed,*" and, by "Formations," "*Exercises in which ships or Divisions run to their stations.*" To "run to station" is "*to proceed there by the shortest route, but above all by the safest route.*"

If we now consult the "Evolutions" chapter of our Signal Books, we shall see that the only questions dealt with there are countersailing, simultaneous, or combined movements "*intended to change the direction of sailing.*" The old "Evolution," which aimed before everything else at changing

the formation in "Lines" or "Groups" without altering course, as for example in the change from "line ahead" to "Division line abreast" (*Ligne de front des Divisions*), has been rigorously replaced by the method of "Formations."

Rightly interpreted this reveals the effect of a justifiable reaction against the abuse of the combinations of "Lines" and "Groups" which characterized the 1892 Signal Book, and also a very legitimate anxiety to reduce the duration of all such exercises to a minimum, but, while cordially approving the abandonment of the majority of the 75 Evolutions of 1892, I have very grave doubts as to the advantage of indiscriminately extending the principle of the Formations to all the movements of that class which it has been necessary to retain.

A priori, the definition of "Formation" given above, extended so as to include certain rules for approaching ships, would seem to satisfy all requirements, and is consistent with common sense—so consistent in fact that its inherent difficulties only become apparent during the actual manœuvre, when this "*shortest, and above all safest, route,*" has to be followed on the water.

The Rules for Approaching only dealt with the case of two convergent routes—they could not do more—and that is where they differ somewhat from the possible eventuality of six or nine armoured ships, which, already very close to each other, simultaneously start to "*run to their station.*" In such a case we should often see one or another of them seeking the safest route at no little distance from the shortest. The time for formation would be correspondingly prolonged. I must further add that it is not always an easy matter to ascertain exactly in two or three minutes the route which satisfies the double condition given, and, since there is always a great haste to fly the answering pennant, errors are frequent.

Yet a "Group" is neither realized nor fully utilizable unless all the ships are at their stations. On counting the time elapsing before the late-comers fall into line, it will be seen that, in the majority of cases, a methodical "Evolution" like that of the 1892 Signal Book, although slower theoretically than if the "Formations" procedure had been followed, would have resulted more quickly in a new and correct formation.

In support of this point of view, I notice that officers commanding Divisions, as well as those in command of Fleets, more often than not reform their Groups by the very movements prescribed by the 1892 Signal Book. It would, therefore, be of interest to reintroduce them into our Signal Books, limiting them, of course, to what is strictly necessary. I estimate that 15 or 20 figures would be amply sufficient.

The officer of the watch would thus be spared delays and possible errors, which are often very excusable, while the method of solving these small tactical problems would be unified for all our warships.

THE CO-EFFICIENT OF INERTIA.

Every manœuvre, both in "Formation" and in "Evolution," resolves itself into taking up a predetermined station with reference to a ship under way (either the guide or the ship next ahead), and the majority of such movements involve changes of speed. Hence the importance of drawing up, as I said at the beginning, precise and simple rules which will allow such variations of speed to be applied to the engines, in good time, as will best meet the prescribed conditions.

The study of the "Co-efficient of Inertia" will lead up to this result. Although it is the solution of a problem in mechanics, it will not be necessary to go to the length of giving the method of reasoning, which belongs to the domain of mathematical research,¹ because it was originally purely experimental, and will remain so in the future, and also because we desire to preserve to the deductions drawn from it their everyday practical character.

I shall indicate by "Advance" or "Delay due to Inertia" (according as a *decrease* or *increase* in the number of revolutions of the engines is intended) the difference between the distance actually traversed in the time necessary for attaining the new speed, and the corresponding distance travelled in the same time at the new speed.

"Advance" or "Delay" due to inertia thus represents the distance that any ship, having a *higher* or *lower* speed (as compared with another which she takes as "regulator") would gain forward of this "regulator" or lose aft of her, if the ship in question waited until she came abreast before assuming the same speed.

The experiments carried out in the early part of 1910 on board the "Justice" and "Vérité"² have clearly brought out from the law governing the variations of speed (within the practical limits required by the Fleet) two constants, whose employment, therefore, determines the conditions for manœuvres involving changes of speed.

The conclusion drawn from these experiments can be stated as follows:—

When getting under way at any speed (the experiment was carried out for six, eight, ten and twelve knots), and also whenever increasing or decreasing speed (the experiment was carried out for variations of four, six and eight knots), it is established:—

(i.) That the time required to arrive at the normal speed corresponding to the number of revolutions of the engines is practically six minutes.

¹ Chief Constructor Bertin has dealt with this question and established a formula by which he compares the numerical values of the "Justice" experiments. (Note to the "Académie des Sciences").

² They formed the subject of a Circular Letter ("Manœuvres and Signals"), dated 17th March, 1910.

(ii.) That the "Advance" or "Delay" due to inertia bears practically a constant ratio to the variation of speed $V^1 - V$.

The knot or sea-mile being taken as the unit of measure, it is found that this ratio for ships of the "Patrie" class (to which the "Justice" and "Vérité" belong) is about 90 metres per knot of increase or decrease in speed. This is the constant to which I give the name "Co-efficient of Inertia."

The product 90 metres $\times (V^1 - V)$, therefore, gives in every case, for the "Patrie" class, the distance (reckoned parallel to the course) *which should finally separate a ship of this class from another ship under way at the moment when speed is altered to that of the other ship with the object of coming abeam of her.*

This was the basis of the following general rule for the battleships of the 2nd Squadron given in the circular letter of 17th March, 1910:—

"In order to take up a predetermined station in relation to a ship under way at a given speed, the same speed as that of the ship in question must be adopted while still 90 metres $\times (V^1 - V)$ forward or aft of the station it is desired to occupy, according as speed is less* or greater."

The application of such a simple rule evidently allows the prompt execution of all movements involving a change of speed with a precision which would be impossible with the most careful eye-measurement. It also furnishes an immediate solution to several problems on combined exercises which the instructions in the old Signal Book Evolutions left quite obscure, such as the following one, which is applicable to modern conditions:—

At what moment should two ships of the same inertia steaming at different speeds, e.g., the one at six and the other at five, assume their normal or signalled speed in order to take up predetermined stations and maintain their relative positions in those stations?

This is the problem which presents itself to Divisional Commanders when changing from "Line Ahead" to "Division Line Abreast," and during the reverse movement.

I have stated the rule that has to be observed in the following form, which is intended to emphasize the reciprocal relationship of the two movements:—

"The two ships should simultaneously adopt the same speed (normal or signalled) at the instant *when either of them would adopt the speed of the other if she had to take her as "regulator."*

I might, however, have said, in the example I selected, the flagship being the leading ship, "*at the instant when the manœuvring vessel is 90 metres $\times (V^1 - V)$ from her station,*" in conformity with the general rule given above.

*This includes the case where $V = 0$.

Such are the practical conclusions from the experiments undertaken with the object of determining the co-efficient of inertia for the "Patrie" class. It will be advisable, however, to examine more closely the numerical data which permit the employment of the two constants adopted.

I must at once state that the experimental method to which I confined myself in 1910, now appears to me to be capable of considerable improvement. The results that I am about to discuss show slight traces therefore of this experimental inadequacy.

As regards the numerical value of the "Co-efficient of Inertia," the observed data gave a mean of 87.7 metres, the distances varying from 83 to 91 metres. The adoption of a round number—90 metres—greatly facilitated the mental calculation to be made on the bridge, and the possible error remains practically of the same order of magnitude as the errors of observation.

With regard to the necessary time for obtaining the normal speed, which I fixed at six minutes in every instance, it appeared, in actual practice, to vary from 5 minutes 45 seconds to 6 minutes 30 seconds between 4 and 12 knots.

The greater part of this difference can be attributed, I think, to the inertia of the engines. It is apparent that a start is more rapidly effected at 30 revolutions, for example, than one at 60.

It will be understood, on the other hand, that with the methods of measuring at our disposal, it is a difficult matter to assign an exact value to the time necessary for attaining normal speed. The most accurate observer with the Barr and Stroud could not guarantee the variations of distance observed every 15 seconds to nearer than 2 or 3 metres. But it is none the less evident that the desired result is achieved if, at the end of six minutes, the normal speed is realized in every instance to within about a thirtieth or a twentieth. The subsequent rectifications for keeping station, should they be necessary will be made by adding to, or deducting from the "*Valessie*" (differential counter)* a certain number of seconds.

Since I have been led to speak of the "*Valessie*," I must call attention to the fact that the rule adopted for its use is inaccurate, and, moreover, this inaccuracy probably increases as the co-efficient of inertia becomes higher.

It would be better to ascertain the necessary correction for each type of ship by direct experiments (which would be very delicate).

Would the study of the co-efficient of inertia lead to equivalent practical results for turbine ships? I must make certain reservations on this point.

The first law of constancy, that of the time necessary to work up to a new speed, evidently pre-supposes that the govern-

*An instrument for showing the variations of the distances between ships under way.—Ed.

ing of the engines is practically negligible in relation to this time interval. This is quite correct in the case of our vertical engines, but is far from being fulfilled at the present time when working with turbines, especially when speed has to be decreased. The value of the factor $V^1 - V$ in our general formula is therefore subject to very wide fluctuations.

REMARKS.

It will be noticed that the adoption of a co-efficient of 90 metres per knot of increase or decrease during a period of six minutes for attaining normal speed is simply tantamount to stating that the gain or loss ("*Avance*" ou "*retard*") due to inertia can be estimated as equivalent to half the distance travelled at a speed of $V^1 - V$. Now $(V^1 - V) \times 90$ metres in six minutes gives $(V^1 - V) \times 15$ metres in one minute, and, the knot being equal to 30 metres, the measured distance corresponds very well to a speed of $V^1 - V$.*

As the law doubtless extends with sufficient accuracy to all types of ships—within the limits of the variations of speed usual in fleets—the relation between the co-efficient of inertia and the time for reaching normal speed becomes most simple.

A period of eight minutes for reaching the normal would correspond to a co-efficient of inertia of $15 \times 8 = 120$ metres, and a period of five minutes, for attaining normal speed, to a co-efficient of $15 \times 5 = 75$ metres.

I might have left these data and summarized the preceding pages in a few lines, but I have preferred to go over the stages of the experiment, which has enabled us to progress so far, because in investigations of this nature experiment is the best guide, and can alone decide the value of a certain number of factors which it is difficult to obtain theoretically.

This little problem of the "Co-efficient of Inertia" will doubtless appear of but small importance in relation to the Tactical Exercises which form the principal object of the training of the fleets. It is also, in my view, only one of the elements of an "Introduction" to the study of manœuvres properly so-called, and, from this point of view, should be amplified by an examination of the gyration curves at the different speeds, by the observation of the effects of longitudinal inertia on the first quadrant of these curves, by measurements of the depreciation of speed after stopping, and by the effect of reversing under way, etc.

I am of opinion that it would be beneficial to ascertain these diverse characteristics of the vessel during her first trials. A knowledge of them would facilitate that precision in steering and engine control which is so essential during rapid movements in very close formation.

* This again amounts to stating that a value corresponding to the arithmetic mean of the two observed speeds can be practically adopted for the approximate distance travelled when altering speed.

THE STRATEGICAL EMPLOYMENT OF CAVALRY.

By MAJOR-GENERAL C. V. F. TOWNSHEND, C.B., D.S.O.,
Commanding Home Counties Division.

THE following reflections upon the strategical action of cavalry were suggested by a lecture on this subject, which was delivered at the Royal United Service Institution on the 24th April;¹ it is hoped that they may prove of interest to students of war who are interested in the higher leading of cavalry.

The introduction to the lecture contained a definition of the rôle of the cavalry in that period prior to the meeting of the two main armies. Their most important mission was described as being that of *reconnaissance* by force and by stealth.

This leads one to consider the different cases of distribution of cavalry in the service of *couverture*, before the commencement of war; for example: (a) in the case where the adverse groups of armies would be quite close, as in a war between France and Germany, or (b) where the adverse groups of armies would be distant from each other as in the case of war between, say, Germany and Russia, or Austria and Italy. In the former case, (a), the cavalry would probably be divided into two parts, one covering the most dangerous flank of the group of armies, while the other would be with the group of armies and destined to take part in the decisive battle.

We also hold that it is more than probable that a war in Europe will not be ended in the first great decisive battle, but that the war will continue, not, perhaps, on the gigantic scale of battle such as the opening scene of war between France and Germany would present, but on a scale, say, of Bonaparte's wars in 1796 and 1800. We see no sense in the oft heard opinion, "Oh, the war will be finished in the first great battle." No nation is vanquished till it admits itself conquered; had France continued the struggle in 1871 she would at least have had Lorraine to-day. The cavalry will play a great rôle in the second stage of a war.

¹ "The Strategical Action of Cavalry," by Brig.-General H. de Lisle, C.B., D.S.O. It appeared to the writer, who was present at the lecture, that the points admitting of divergence of opinion were too numerous and weighty to have been dealt with verbally in a satisfactory manner, in the short period available for discussion on conclusion of the lecture.—C.V.F.T.

On page 788 of the June number of this JOURNAL we read that:—

"Before committing his forces to any definite plan, the Commander-in-Chief will require reliable information of the enemy's dispositions, his places of concentration, the direction of march of his forces, and the nature of the country between the two armies; for this information he trusts to the commander of his independent cavalry."

This passage was understood by some speakers who took part in the discussion as implying that the Commander-in-Chief would wait for the cavalry General to send him full information on the above headings. Now it is generally allowed that *strategic* offensive, when it is a case of war between Powers sensibly equal, alone leads to victory; it is not only advantageous, but it is indispensable. The strategist (Commander-in-Chief), who, directly he has concentrated his masses (principle of economy of force), deliberately moves forward in the general direction of the bulk of the hostile forces in the field, and against that point of the enemy (*i.e.*, against one of his flanks or his centre), which strategic reasons indicate as being his weakest point, will act with his mass, and will have, therefore, the greatest chance of success, given, of course, that he has a general knowledge of the whereabouts of the enemy, indicated in peace time by the presence of railways and detraining platforms, intelligence department, etc., including, of course, those new agents of reconnaissance and assistants to the strategic cavalry, *viz.*, aeroplanes.

THE LESSONS OF THE MANCHURIAN WAR.

The war in Manchuria provides numerous examples to illustrate this interesting subject. General Kuropatkin, whose character as an over-cautious and hesitating General now stands revealed by official documents, considered that he could not advance and deliver battle until he was accurately informed as to the enemy's strength and positions. Now, this is precisely the information which, in these days, one is not going to get in a precise manner; the German cavalry did not get it in 1870; nor did Kuropatkin get it in 1904; he remained inactive, and was beaten in consequence.

The strategical lessons of the war in Manchuria show that the Commander-in-Chief *cannot* wait for accurate information to reach him, because he is never going to get this accurate information; that is all done in *peace time*, as mentioned above. As soon as he has formed his plans, and concentrated every available man to fight, on the principle of economy of force, detaching the minimum necessary, he must move forward straight on his objective, which is the bulk of the enemy's forces in the field. It does not matter if the enemy concentrates a few hours or a day before him; he is not going to let the enemy impose his will on him.

Another point to consider is that of the cavalry duel, the great battle between the opposing cavalry bodies, with which it is often said that the period of reconnaissance will end.

Now, from what has been said in the first page of this article, it will be seen that this great preliminary cavalry battle which, in the opinion of many military writers, is a useless sacrifice of men and animals—resulting perhaps in the complete disorganization and exhaustion of both parties—has little chance of coming off, and that the cavalry would be much more profitably employed in assisting in the great *decisive* battle, which must be fought out by the infantry and artillery, and which is, perhaps, to decide the fate of the campaign.

The Lecturer referred to the large amount of intemperate matter which has been written on the subject of cavalry in recent years, and pointed to the fact that even eminent military writers of the various great Powers have raised doubts as to the possibility of great cavalry successes in future wars. In this connection it is interesting to note that, since Napoleon gave us those examples of how to use cavalry in battle, in the great charges launched by him (Austerlitz, Jena, Eylau, Friedland, Essling, Wagram, Borodino), the rôle of cavalry in great battles has gradually got smaller and smaller (examples 1866, 1870); in the latter wars the action of cavalry on the battlefield was attended with good results when they were employed in small fractions (such as Von Bredow's brigade at Rezonville), and it was unsuccessful when they were used in masses (as by Gallifet at Sedan, or by Bonnemain at Froeschwiller). Towards the end of the 19th century we find a host of writers decrying cavalry action, and the chorus is renewed with vehemence at the commencement of the 20th century, when all jumped to hasty conclusions during the campaign in Manchuria, and loudly proclaimed that cavalry was a failure, before they were in possession of *official documents*.

Now that we have these official documents we discover that the Japanese had few cavalry, and in consequence were not able to put the indecisive victories of Liao Yang and Mukden to good account.¹

It also appears that the Japanese have deeply regretted their want of cavalry, and intend, as the result of their experience of the latest war, to raise the strength of that arm to eight divisions. To us the most interesting lesson of the war as regards cavalry work is to find the Japanese cavalry supplementing its numerical inferiority by means of infantry support

¹ It must not be forgotten that the primary cause of the indecisive nature of the victories of Liao Yang and the Sha Ho, was the fact that the Japanese had violated the principle of *economy of force* by detaching 150,000 men to take Port Arthur, that fortress being a secondary objective, whereas, on the principle of economy of force, the *mass* of the Japanese was required to destroy the bulk of the Russian forces in the field.

(mixed detachments), during the Liao Yang manœuvre, and executing its mission (*viz.*, to cover the left flank of the group of armies) very skilfully. The employment, in this way, of mixed detachments,¹ acting as support, *points d'appui*, to strategic cavalry is the plan of the late General Langlois, the eminent strategist, and it is advocated by many of the leading French Generals of to-day.

It is generally allowed by the leading military experts in France to-day that a large strategic (or general) advanced guard to a group of armies, having a front of some 42 miles or more, is nothing more or less than a positive danger (especially when it is placed under the General commanding the strategic cavalry), for it is a violation of the principle of economy of force;² it involves a serious dissemination of force, and it may be overwhelmed before aid can arrive, or it may force the Commander-in-Chief to fight at a time and place against his intentions. On the Russian side, we find that the cavalry, although numerous, gave mediocre results, generally speaking. But, we ask, did General Kuropatkin give his cavalry a proper chance, when he disseminated it in small parties over the zone of operations, thus violating that principle of economy of force, which has never been violated in history without disaster?³

It was only the premature surrender of Stoessel at Port Arthur which released the Japanese Third Army (Nogi) and enabled it to reach the bulk of the Japanese forces in time to take part in the battle of Mukden. General Mishchenko, with his cavalry performing the service of *couverture*, gave accurate information regarding the disembarkation and movements of the Japanese armies; but we find General Kuropatkin allowing no initiative whatever to his General in command of the army of *couverture*, and interfering to such an extent as to render action impossible.

To sum up, the war in Manchuria has in no way proved the failure of cavalry; it has simply shown that this arm can only give great results when it is well employed.

¹ The true rôle of cyclist infantry is here indicated.

² The experience of former wars proves on the contrary that in order to be properly informed, the commander of an army should correspond directly with each of the divisions of cavalry which are scouting his front and flanks. To let all information pass through the commander of a great corps of cavalry before coming to the Commander-in-Chief of a group of armies is to introduce a middle man, and so lose time. Moreover, there is the possibility of the Commander-in-Chief seeing his commander of cavalry giving orders contrary to his intentions. Take the example of 1805, when the Russians changed the direction of their march, passed the river and uncovered Vienna. What direction to operate in and what was to be done could only be settled by the Commander-in-Chief; Napoleon's reproaches to Murat on that occasion are interesting reading.

³ Examples: The Austrians in 1796, 1800, 1805, 1809, 1866; Napoleon in 1813 and 1815; the French in 1870; the Russians in 1904.

NAPOLEON'S CAVALRY.

We repeat, there is more to be learnt from the lessons of the latest campaign, viz., the war in Manchuria, than from the examples of Napoleon's method of using cavalry, both from a strategic and tactical point of view—for though the great fundamental principles of war laid down by Napoleon, the founder of modern strategy, do not change, still it cannot be denied that the methods of fighting are not the same in 1912 as they were a hundred years ago. Napoleon in battle held his cavalry in masses at a short distance from the enemy, say, at 600 or 700 yards, ready to charge on the first favourable opportunity; whereas to-day cavalry would have to await their opportunity concealed in folds of the ground, etc., far distant from the lines of hostile infantry; the open and rolling ground formerly sought by the cavalry general, has to-day become the cherished terrain of the infantry and artillery; cavalry is compelled to seek for the covered approaches, formerly dear to the rifleman, in order to be able to approach the hostile infantry, and even then it must risk annihilation before getting into a gallop. It is, in short, by *surprise* alone that cavalry can now succeed in modern battle, *i.e.*, it must surprise infantry before the latter is ready to receive the charge; and even this eventuality promises to be rare. The dangerous zone in Napoleon's time was 200 yards, whereas now we have 2,000 yards for rifle, and, say, 5,000 or 6,000 yards for field guns; moreover, magazine rifles have dispensed with all the complicated infantry formations of the past; commanders of units have only to close their elastic single rank formations in order to face the threatened point of attack, in any place they may happen to be. In short, the introduction of the small bore rifle has compelled infantry under fire to abandon the dense lines of Wellington at Vittoria and the massive columns of Macdonald at Wagram, and of Ney at Waterloo. As infantry and artillery have had to effect an entire change in their fighting tactics, we hold that cavalry also cannot be permitted to preserve the methods of Austerlitz and Wagram, *i.e.*, the tactics of the smooth bore cannon and the flint-lock musket.

Austerlitz, Eylau and Wagram are sometimes instanced as battles won by cavalry charges, but at Eylau the great charge of Murat, with his 80 squadrons of cavalry, was ordered by the Emperor to be delivered, in conjunction with Marshal Davout's turning movement, with a view to checking the advance of the Russians (who had assumed the offensive after the infantry attack delivered by Augereau's Army Corps had failed). Though Murat's charge practically destroyed the Russian centre, it was unable to do more owing to the difficulties of the ground; the turning movement of Marshal Davout with the Third Army Corps also came to a standstill. The Emperor had actually ordered a retirement in the night when the arrival of Ney's

Army Corps at nightfall to turn the Russian right, decided Benningsen to retreat. In short, we contend that Napoleon won at Wagram, Eylau and Friedland, as at Jena, Bautzen and Ligny, *not* by the shock action of his cavalry, but by using his favourite manœuvre (in strategy as in tactics), that is to say by delivering a *turning attack* with his secondary mass (*which was generally accompanied by the bulk of the cavalry*) against that wing and portion of the enemy's rear which was nearest the latter's natural line of retreat; and he combined with this movement his *main attack* with his *principal mass* against the same wing which was being turned by the secondary mass. The other wing of the enemy (farthest from his line of retreat) which was not turned, he contained by attacking and holding it with his minimum force, which under an independent commander, had to fight a combat of more or less defensive character, *i.e.*, a combat "*d'immobilisation et d'usure*" (example, Massena at Wagram). Napoleon won the above quoted great battles by using his great fundamental principles of economy of force, mass, rapidity and security in combination; the artillery might claim to have won Napoleon's victory at Eylau just as much as the cavalry. It was Davout's *turning movement in conjunction with Macdonald's advance with the principal mass* which won Wagram.

On page 792 we read :—

"We find him (Napoleon) following no doctrine or general theories, but he uses his cavalry for special purposes, giving very clearly defined instructions on each occasion. Not once did he send all his cavalry reserve on a vague mission of exploration. . . . In 1805 he sent it across the Rhine as a screen to deceive the enemy, and when the Grand Army executed its turning movement on Ulm, this cavalry, supported by two corps acted as flank guard."

This procedure was, in fact, the carrying out of his principle of security, which, in other words, was the retaining of his liberty of action and manœuvre by means of his cavalry supported by infantry; and the flank guards of his army came under the heading of the same principle. To-day a commander-in-chief of a group of armies will impose it in the same way by using strategic cavalry supported by *mixed* detachments. Throughout all his campaigns we find Napoleon faithful to the principle of security, and 1796 is perhaps the first illustration of this practice.

"All the great captains of antiquity, and those who later have marched worthily in their footsteps, have only done great deeds by conforming to the principles of the art of war . . . whatever may have been the audacity of their enterprise and the extent of their success they have only succeeded by conforming to those principles . . . one has attributed my greatest successes to luck, and imputed my reverses to my faults; but if I wrote my campaigns, one would be very astonished to see that *in every case I exercised my faculties in conforming to the principles of war.*"—Napoleon's conversation at St. Helena, 16th November, 1816.

Napoleon's victories have been ascribed to the fact that his cavalry generals were all young men; but this fact applied to nearly all his generals, and was the natural outcome of 20 years of war from the time of the Revolution till Waterloo. Not one of his generals was over 49 in the 1815 campaign; his oldest general in that campaign was Grouchy, a cavalry general whose handling of the detachment on Napoleon's right flank left much to be desired. On the other hand, the gallant Blücher, another cavalry general, the most tenacious and bitter opponent Napoleon ever encountered, was over 70 when he led the cavalry charge to retrieve the day at Ligny and when, two days afterwards, he encouraged and urged on his Prussian infantry in their wonderful march to help Wellington at Waterloo.

Napoleon ...	46 years.	Vandamme...	44 years.
Davout ...	45 "	Rapp ...	43 "
Ney ...	46 "	Clauser ...	43 "
Grouchy ...	49 "	Suchet ...	43 "
Lobau ...	45 "	Pajol ...	43 "
Lamarque ...	45 "	Gerard ...	42 "
Kellerman ...	45 "	Drouet ...	41 "
Reille ...	44 "	Exelmans ...	40 "

The above is the age of Napoleon's commanders of army corps in the 1815 campaign; several of the divisional generals were under 40, and one brigadier, Labédoyère, was 29.

CAVALRY IN PURSUITS AND RAIDS.

The rôle of *cavalry in pursuit* is the most important that is played by that arm, especially so in the 20th century, when, as far as we have seen, the long duration of battles leaves the infantry of the victor or vanquished equally exhausted and incapable of movement. Cavalry is the only arm which can to-day be used in the pursuit; it is all very well for writers to attack generals for not pursuing after a victory, for not exploiting their success, for not having destroyed the beaten enemy. But it must be recognized by practical men that if the pursuit was not carried out it was because of the exhaustion of the troops.

Since the days of Napoleon we no longer hear of the head-long pursuits of cavalry with their swords in the enemy's backs and with such brilliant results (example, the pursuit of the French cavalry after Jena, where fortresses surrendered to a few dragoons).

Is not the reason to be found, in this century, in the enormous size of the groups of armies on each side? Will such great numbers, in case of defeat, break up and dissolve like the allies at Austerlitz or like the French at Waterloo? Will not a group of armies retire in much more deliberate fashion? Take the example of Liao Yang and Mukden. Did the German

cavalry pursue after Froeschwiller? Did it not remain inactive after Rezonville?

Again, in a war in the 20th century it would appear that one of the chief duties of cavalry in pursuit will be to prevent the beaten side from destroying the *railways*, and especially bridges, in their retreat. As an example of the modern form of pursuit of cavalry, we prefer to read of Sherman's exploit in the pursuit of Lee and Johnston, to reading Napoleon's wars, *i.e.*, if we want to get precise indications as to the rôle of cavalry in the pursuit of to-day.

There is no space here to touch on the rôle of cavalry in strategic raids; it would be an interesting point to discuss whether the using up of *fighting cavalry* for raiding work is not a violation of economy of force? However, it appears, we can accept it as a fact that during the past century the *tactical rôle of cavalry has diminished and its strategic rôle has greatly increased*; and we think it will be very shortly accepted throughout Europe, that—given the great strategic fronts of modern groups of armies, some 50, 60, 70 miles or more—the use of a large strategic advanced guard to a group of armies is a violation of the principle of economy of force, and that, on the contrary, the principle of strategic cavalry, using a chain of mixed detachments as a support, will be accepted.



NAVAL NOTES.

PARLIAMENTARY VISIT TO THE FLEET.

An official visit of the Members of both Houses of Parliament to the Home Fleets, assembled at Spithead, preparatory to the manœuvres, took place on the 9th ult. The fleets were composed as follows :—

FIRST FLEET.

First Battle Squadron—"Neptune" (flagship of Acting Admiral Sir G. A. Callaghan, G.C.V.O., K.C.B., Commander-in-Chief, Home Fleets, and Commander-in-Chief, Red Fleet, for the manœuvres); "Collingwood" (flagship of Vice-Admiral the Hon. Sir S. C. J. Colville, K.C.B., C.V.O., commanding First Battle Squadron); "St. Vincent" (flagship of Rear-Admiral C. E. Madden, C.V.O.); "Bellerophon"; "Dreadnought"; "Superb"; "Temeraire"; "Vanguard."

Attached Cruisers—"Gloucester"; "Liverpool."

Attached Ship—"Swift."

Hospital Ship—"Maine."

First Cruiser Squadron—"Lion" (flagship to Rear-Admiral L. Bayly, C.V.O., Commanding); "Indefatigable"; "Inflexible"; "Invincible."

Second Battle Squadron—"Thunderer" (flagship of Acting Admiral H.S.H. Prince Louis of Battenberg, G.C.B., G.C.V.O., K.C.M.G., Commander-in-Chief, Blue Fleet, for the manœuvres); "Hercules" (flagship of Vice-Admiral Sir J. R. Jellicoe, K.C.B., K.C.V.O., commanding Second Battle Squadron); "Orion" (flagship of Rear-Admiral H. G. King-Hall, C.V.O., C.B., D.S.O.); "Agamemnon"; "Colossus"; "Lord Nelson"; "Monarch."

Attached Cruisers—"Bristol"; "Falmouth."

Second Cruiser Squadron—"Indomitable" (flagship of Rear-Admiral Sir G. J. S. Warrender, Bart., K.C.V.O., C.B., commanding); "Achilles"; "Cochrane"; "Natal"; "Warrior."

Third Battle Squadron—"King Edward VII." (flagship of Acting Vice-Admiral C. Burney, commanding); "Hibernia" (flagship of Rear-Admiral Sir C. G. F. M. Cradock, K.C.V.O., C.B.); "Africa"; "Britannia"; "Commonwealth"; "Dominion"; "Hindustan"; "Zealandia."

Attached Cruisers—"Dartmouth"; "Weymouth."

Third Cruiser Squadron—"Shannon" (flagship of Rear-Admiral F. C. D. Sturdee, C.V.O., C.M.G., commanding); "Argyll"; "Black Prince"; "Duke of Edinburgh."

Fourth Battle Squadron—"Exmouth" (flagship of Acting Vice-Admiral C. J. Briggs, commanding); "Duncan" (flagship of Rear-Admiral T.H. M. Jerram); "Cornwallis"; "Russell."

Attached Cruiser—"Doris."

SECOND FLEET.

Fifth Battle Squadron—"Queen" (flagship of Acting Vice-Admiral F. T. Hamilton, C.V.O. commanding); "Prince of Wales" (flagship of Rear-Admiral A. Y. Moggridge); "Bulwark"; "Formidable"; "Implacable"; "Irresistible"; "London"; "Venerable."

Attached Cruiser—"Hyacinth."

Fifth Cruiser Squadron—"King Alfred" (flagship of Rear-Admiral H. L. Tottenham, commanding); "Antrim"; "Carnarvon"; "Devonshire"; "Roxburgh."

Sixth Cruiser Squadron—"Aboukir" (flagship of Rear-Admiral D. Beatty, C.B., M.V.O., D.S.O., commanding squadron for manœuvres); "Cressy"; "Euryalus"; "Sutlej"; "Swiftsure"; "Triumph."

THIRD FLEET.

Seventh Battle Squadron—"Illustrious" (flagship of Vice-Admiral Sir H. B. Jackson, K.C.B., K.C.V.O., F.R.S.); "Prince George" (flagship of Rear-Admiral C. Dundas of Dundas); "Cæsar"; "Hannibal"; "Majestic"; "Mars"; "Victorious."

Attached Cruiser—"Talbot."

Training Squadron—"Leviathan" (flagship of Rear-Admiral E. E. Bradford, C.V.O.); "Berwick"; "Cornwall"; "Cumberland"; "Donegal"; "Essex."

Mediterranean Cruiser Squadron—"Hampshire"; "Suffolk."

Minelayers Squadron—"Apollo"; "Intrepid"; "Iphigenia"; "Latona"; "Naiad"; "Thetis."

Mine Sweeping Gunboats—"Circe"; "Jason"; "Seagull."

DESTROYER FLOTILLAS OF THE FIRST FLEET.

First Destroyer Flotilla.

Flotilla Cruisers—"Blonde"; "Pathfinder."

Depôt Ship—"Venus."

Destroyers—"Acheron"; "Archer"; "Ariel"; "Attack"; "Defender"; "Druid"; "Ferret"; "Forester"; "Goshawk"; "Hind"; "Hornet"; "Hydra"; "Jackal"; "Lapwing"; "Lizard"; "Phoenix"; "Sandfly"; "Tigress."

Second Destroyer Flotilla.

Flotilla Cruisers—"Attentive"; "Bellona."

Depôt Ship—"Blake."

Destroyers—"Acorn"; "Alarm"; "Brisk"; "Cameleon"; "Comet"; "Goldfinch"; "Larne"; "Lyra"; "Martin"; "Minstrel"; "Nemesis"; "Nereide"; "Nympe"; "Redpole"; "Rifleman"; "Ruby."

Third Destroyer Flotilla.

Flotilla Cruisers—"Boadicea" (flagship of Commodore Sir R. K. Arbuthnot, Bart., M.V.O., commanding Third Destroyer Flotilla); "Patrol."

Depôt Ship—"Blenheim."

Destroyers—"Basilisk"; "Beagle"; "Bulldog"; "Foxhound"; "Grasshopper"; "Harpy"; "Mosquito"; "Nautilus"; "Pincher"; "Raccoon"; "Rattlesnake"; "Renard"; "Savage"; "Scorpion"; "Scourge"; "Wolverine."

Fourth Destroyer Flotilla.

Flotilla Cruiser—"Blanche."

Depôt Ship—"Hecla."

Destroyers—"Afridi"; "Amazon"; "Cossack"; "Crusader"; "Fury"; "Ghurka"; "Hope"; "Maori"; "Mohawk"; "Nubian"; "Saracen"; "Sheldrake"; "Staunch"; "Tartar"; "Viking"; "Zulu."

PATROL FLOTILLAS.

Sixth Destroyer Flotilla.

Flotilla Cruisers—"Sentinel"; "Skirmisher"; "Topaze."

Destroyers—"Albacore"; "Bat"; "Bonetta"; "Cheerful"; "Fairy"; "Falcon"; "Fawn"; "Flying Fish"; "Gipsy"; "Greyhound"; "Kangaroo"; "Leven"; "Mermaid"; "Osprey"; "Ostrich"; "Peterel"; "Racehorse"; "Star"; "Syren."

Seventh Destroyer Flotilla.

Flotilla Cruisers—"Adventure"; "Sapphire."

Depôt Ship—"Leander."

Destroyers—"Arab"; "Avon"; "Bittern"; "Dove"; "Express"; "Griffon"; "Leopard"; "Lively"; "Locust"; "Orwell"; "Panther"; "Quail"; "Seal"; "Sprightly"; "Success"; "Sylvia"; "Thorn"; "Thrasher"; "Vigilant"; "Violet."

Eighth Submarine Flotilla.

Depôt Ship—"Bonaventure."

Tender to Depôt Ship—"Adamant."

Submarines—"D 1"; "D 3"; "D 4"; "D 5"; "D 6."

In all there were present—44 battleships; 5 battle-cruisers; 25 armoured cruisers; 9 protected cruisers; 12 flotilla cruisers; 7 depôt ships; 6 mine-layers; 3 torpedo gunboats; 106 destroyers; 5 submarines; 1 hospital ship; making a grand total of 223 vessels.

The fleet was anchored in four lines as follows:—

Line A: Battleships—"Neptune" (flagship of Commander-in-Chief, heading Eastern extremity of line), "Collingwood," "Temeraire," "Dreadnought," "St. Vincent," "Bellerophon," "Vanguard," "Superb," "King Edward VII.," "Dominion," "Africa," "Commonwealth," "Hibernia," "Zealandia," "Hindustan," "Britannia," "Exmouth," "Russell," "Illustrious," "Cæsar," "Mars," "Hannibal," "Prince George," "Majestic," "Victorious," "Triumph," "Swiftsure."

Armoured Cruiser—"Euryalus."

Depôt Ships for Destroyers—"Blake," "Blenheim."

Line B: Battleships—"Thunderer" (flagship of Prince Louis of Battenberg, heading Eastern extremity of line), "Hercules," "Colossus," "Monarch," "Orion," "Lord Nelson," "Agamemnon," "Queen," "Implacable," "London," "Venerable," "Prince of Wales," "Formidable," "Bulwark," "Irresistible," "Duncan," "Cornwallis."

Armoured Cruisers—"Leviathan," "Donegal," "Berwick," "Essex," "Cornwall," "Cumberland," "Suffolk," "Hampshire," "Aboukir," "Cressy," "Bacchante."

Depôt Ships for Destroyers—"Leander," "Hecla."

Line C: Armoured Cruisers—"Lion," "Indefatigable," "Inflexible," "Invincible," "Indomitable," "Cochrane," "Achilles," "Warrior," "Natal," "Shannon," "Black Prince," "Duke of Edinburgh," "Argyle," "King Alfred," "Devonshire," "Antrim," "Roxburgh," "Carnarvon."

Line D: Cruisers—"Bristol," "Falmouth," "Weymouth," "Dartmouth," "Liverpool," "Gloucester," "Hyacinth," "Doris," "Talbot," "Venus."

Flotilla Cruisers—"Pathfinder," "Attentive," "Patrol," "Sentinel," "Skirmisher," "Adventure," "Blonde," "Blanche."

Hospital Ship—"Maine."

Torpedo Gunboats—"Jason," "Seagull," "Circe."

Minelayers—"Naiad," "Latona," "Intrepid," "Apollo," "Thetis," "Iphigenia."

The First and Fourth Destroyer Flotillas were anchored inshore of line D, off Browdown; the Second and Third Flotillas, with the "Boadicea" (Commodore) and "Bellona," between Gilkicker Point and the Spit Fort; the Sixth and Seventh Flotillas, with the "Sapphire" and "Topaze," off Ryde, and the submarines in Stokes Bay.

The "Enchantress," flying the Admiralty flag, followed by the S.S. "Armada Castle," with the Members of Parliament on board, after passing through the lines, anchored about a quarter past one near the Horse Fort. There then followed a fine exhibition by the hydro-aeroplanes. The 100 h.p. "H 1," piloted by Commander Samson, flew out from the sheds at Eastney and made a wide circle seaward in the direction of the Nab Lightship. Flying at a height of about 400 feet above the water and at about a speed of 40 miles an hour, the airman was soon out of sight; returning he made a graceful *vol-plané* to the water, and after skimming the surface for some little distance alighted on it. After a run of about a mile at a speed of from 15 to 20 miles an hour he rose again as the wind freshened under his planes, and soared away on his return journey. A second hydro-aeroplane, the 100 h.p. "T 5," piloted by Lieutenant Grey, flew out some ten minutes later, from Eastney, making a bee-line for the "Neptune," and after making a fine curve to the left dropped down between the columns of warships, and rising again, passed away to the eastward. About the same time Lieutenant L'Estrange Malone, on the 70 h.p. aeroplane, rose from the special platform provided on the bows of the "London," and soared away to a great height, passing through the clouds at an altitude of something like 2,000 feet.

Then followed an attack by the destroyers upon the leading flagships at the eastern end of the columns, the "Neptune" and "Thunderer," and an attack by the submarines, but it being a dead calm the disturbance of the surface by the periscopes was plainly visible as the boats advanced with only the tops of the periscopes visible. Afterwards the submarines and destroyers gave an exhibition of their use for offensive purposes. Two divisions of boats came up from the direction of the Nab, going at a

great speed, each boat discharging a torpedo at her objective as she passed, the position of the torpedo being indicated by the firing of a Holme's light.

Several of the ships were visited by Members, who afterwards inspected two submarines—"D 3" and "D 5." At 5 o'clock the fleet weighed and headed by the "Lion" and the cruiser squadrons passed out to sea *en route* for the manœuvres in the North Sea.

GERMANY.

The following are the principal promotions and appointments which have been made:—

Vice-Admiral—Coerper to Admiral and command of the Baltic Station. Rear-Admirals—von Dambrowski to Vice-Admiral and Inspector of Training Establishments; Lans to command of Training Squadron; von Rebeur-Paschwitz to command of Scouting Division. Kapitän zur See—Philipp to "Goeben"; Lange to "Wittelsbach."

Marineverordnungsblatt.

The Estimates for 1912.

The Estimates for 1912 amount to £22,008,746, as against £21,095,932, the amount approved by the Reichstag for last year, being an increase of £912,814. The following are the principal items:—

ORDINARY PERMANENT ESTIMATES.

	Proposed for 1912. £	Voted 1911. £
Imperial Ministry of Marine and Naval Cabinet ...	115,960	111,651
Admiral Staff	17,521	16,091
Naval Observatories	21,240	20,450
Station Accounts Departments	43,841	42,532
Legal Department	10,727	10,544
Naval Chaplains and Garrison Schools	10,285	9,940
Pay of Officers and Men	2,037,400	1,910,010
Maintenance of Fleet in Commission	2,472,396	2,300,245
Victualling	157,162	141,380
Clothing	28,503	24,370
Garrison Administration and Works Department	116,813	110,470
Lodging Allowance, &c.	207,709	204,073
Medical Department	164,040	158,648
Travelling Expenses, Freight Charges, &c. ...	207,866	196,808
Training Establishments	31,126	27,904
Maintenance of Fleet and Docks	1,810,310	1,779,725
Ordnance and Fortification	1,038,550	922,886
Accountant Department	60,995	58,233
Pilotage, Coastguard and Surveying	44,681	42,684
Miscellaneous Expenses	104,391	87,948
Administration of Kiau-Chau Protectorate ...	7,619	7,800
Total of Ordinary Permanent Estimates	8,709,135	8,184,392

SPECIAL ORDINARY ESTIMATES.

Building Programme for 1912.

For the construction and completion of the following ships:—

	£
Battleship "Oldenburg" (Ersatz "Frithjof"), 4th and final vote	230,054
Battleship "Kaiser" (Ersatz "Hildebrand"), 4th and final vote	367,102
Battleship "Friedrich der Gross" (Ersatz "Heimdall"), 4th and final vote	367,102
Armoured Cruiser "Goeben" (H), 4th and final vote	252,099
Battleship "Kaiserin" (Ersatz "Hagen"), 3rd vote	440,529
Battleship Ersatz "Ægir," 3rd vote	440,529
Battleship Ersatz "Odin," 3rd vote	440,529
Armoured Cruiser (J), 3rd Vote	416,055
Small Cruiser "Stralsund" (Ersatz "Cormoran"), final vote	73,420
Small Cruiser "Strasburg" (Ersatz "Condor"), final vote	73,420
Torpedo Nets	106,706
Battleship Ersatz "Kurfürst Friedrich Wilhelm," 2nd vote	513,954
Battleship Ersatz "Weissenburg," 2nd vote	513,954
Battleship (S) ¹	513,954
Armoured Cruiser (K)	538,420
Small Cruiser Ersatz "Seeadler"	122,370
Small Cruiser Ersatz "Prinzess Wilhelm"	122,370
Salvage Ship for Sunken Vessels	73,420
Torpedo-boat Division, final vote	318,160
Torpedo-boat Division, 1st instalment	416,055
Submarines, Construction and Experiments	734,216
Alteration and Improvement of Battleships	48,948
Alteration and Improvement of Large Cruisers	24,474
Total	£7,906,508

SUMMARY.

Heads of Expenditure.	Estimates for Financial Year 1912.	Granted for Financial Year 1911.
	£	£
Ordinary Permanent Estimates - - -	8,709,135	8,184,392
New Construction and Alterations - - -	7,906,508	7,907,490
Armaments, Torpedoes and Mines - - -	3,881,057	4,335,440
² Other items - - - - -	1,512,046	668,610
Total - - -	£22,008,746	£21,095,932

Etat für die Verwaltung der Kaiserlichen Marine Auf das Rechnungsjahr, 1912.

Naval Law Amendment Bill.

The following are the important articles in the new Bill:—

The Battle Fleet will consist of one fleet flagship, five squadrons of eight battleships each, 12 large cruisers and 30 small cruisers as scouts.

¹ S is not a replacing ship, but additional to strength of fleet.

² Including improvement of docks at Wilhelmshaven, Kiel and Dantzig, coast fortifications and other buildings on North Sea and Baltic Coasts, harbour for small vessels at Heligoland, etc.

The Foreign Service Fleet will consist of eight large cruisers and ten small cruisers.

Further: One fleet flagship, three squadrons of battleships, eight large cruisers, and 18 small cruisers form the Active Battle Fleet; two squadrons of battleships, four large cruisers and 12 small cruisers form the Reserve Battle Fleet.

It should be noted that the German large cruisers include both battle and armoured cruisers.

The whole of the battleships and cruisers of the Active Battle Fleet and a quarter of those of the Reserve Battle Fleet are to be kept permanently in commission.

The following proportions of warrant officers, petty officers, and men of the seamen, dockyard and torpedo divisions, as well as the submarine sections, shall be available:—

1. Full crews for the ships belonging to the Active Battle Fleet, for the whole of the torpedo-boats and submarines, with exception of the material reserve of both these classes of boats, for the school ships and for the special ships.

2. Nucleus crews (one-third of the engine-room personnel, one-quarter of the remaining personnel of the full crews) for the ships belonging to the Reserve Battle Fleet.

The argument in the Bill lays it down that:—

“The organization of the Fleet still suffers from two serious defects:

“The one defect consists in the fact that in the autumn of every year the time-expired men, *i.e.*, almost one-third of the crew in all ships of the Battle Fleet, are discharged, and replaced mainly by recruits from the *inland population*. Owing to this, the readiness of the Battle Fleet for war is considerably impaired for a prolonged period.

“The second defect consists in the fact that at the present time, with an establishment of 58 capital ships, only 21 capital ships are available at first, if the Reserve Fleet cannot be made ready *in proper time*. Since the Fleet Law was drawn up, this latter has become more and more unlikely, as the moment at which the Reserve Fleet can be ready for war gets more and more deferred. This is a consequence of the ever-growing complexity of modern ships and of the steadily growing difficulty in training large organizations. At the present day, therefore, the Reserve Fleet only comes into consideration as a *second fighting line*; but in view of our great numerical strength in reserve men, it still maintains its great importance.

“Both these defects are to be removed, or at any rate considerably ameliorated, by the gradual formation of a third *active* squadron.

“The requisite *ships* for this third active squadron are to be derived:—

“(a) By dispensing with the Reserve Fleet Flagship.

“(b) By dispensing with the present existing Material Reserve—four battleships, four large and four small cruisers.

“(c) By newly constructing three battleships and two small cruisers.

“As the *maintenance in commission* of ships in the Reserve Fleet can be reduced by one-half in consequence of the increase of active organizations, the formation of a third active squadron only renders the additional maintenance in commission of three battleships, three large and three small cruisers necessary beyond those to be maintained in commission already provided for in the Fleet Law. This involves a corresponding increase in personnel.

"A further increase in personnel is necessary as the complements of all classes of ships, including torpedo boats, have had to be augmented.

"Moreover, an increase in submarines and the acquisition of some airships is contemplated. The submarines, which are still at the present moment without organization, are to be organized—as regards manning—after the manner of the torpedo boats.

"Consequently, there will be additionally in commission in the future:—

"Three battleships, three large cruisers and three small cruisers."

The new Bill makes no change in the number of torpedo-boats, which remains at 144; of these, 99 are kept ready for use, with full active service crews, and 45 without crews as Material Reserve.

It is proposed to demand six submarines every year. With a 12 years' life this gives an establishment of 72 boats. For 54 of these boats active service crews are estimated for; 18 form the Material Reserve without crews.

FUTURE PROGRAMME OF CONSTRUCTION.

Year.	Battleships.	Large Cruisers.	Total Large Ships.	Small Cruisers.
1912	1	1	2	2
1913	2†	1	3	2
1914	1	1	2	2
1915	1	1	2	2
1916	2†	1	3	2
1917	1	1	2	2*

† Including one additional ship under the Amendment.

* Including one additional ship outstanding from the Fleet Law.

The year of construction of one battleship and two small cruisers is reserved.

PERSONNEL.

The additional requirements of Training personnel is a consequence of the increase in active naval fighting forces.

(A.) *Men of the Seamen, Dockyard, and Torpedo Divisions, as well as of the Submarine Sections.*

Additional Requirements for—	Warrant Officers.	Master-at-Arms and Chief Petty Officers.	Petty Officers.	Men.	Total.
Additional maintenance in commission under the amendment	155	6	1,402	6,711	8,274
Submarine service (submarines, flotilla vessels, tenders, salvage ships, shore requirements)	102	10	693	1,441	2,246
Alterations in complements ...	34	...	755	3,001	3,790
Additional requirements in the year 1920	291	16	2,850	11,153	14,310
Average annual increase ...	32	2	316	1,240	1,590*

* 500 men are to be demanded in excess of the average annual increase in each of the three years 1912 to 1914. This increase is to be balanced by a corresponding decrease in the three years 1918 to 1920.

(B.) *Executive Officers.*

Additional requirements for —	Admirals.	Vice-Admirals.	Rear-Admirals.	Senior Captains.	Junior Captains.	Commanders.	Senior Lieutenant's	Lieutenants.	Sub-Lieutenants.	Total.
Additional maintenance in commission under the amendment	...	2	1	12	45	48	119	96	323	
Submarine service (submarines, flotilla vessels, tenders, salvage ships, shore requirements)	4	59	58	...	121	
Alterations in complements	26	-26	...	-11	-11	
Additional requirements in the year 1920	...	2	1	12	75	81	177	85	433	
Average annual increase	1	9	9	20	9	48	

CALCULATION OF COST.

Description of Expenditure.	Expenditure					
	1912.	1913.	1914.	1915.	1916.	1917.
A. Shipbuilding and armaments, including submarines and airships	£	£	£	£	£	£
B. Other non-recurring expenditure—	342,000	832,000	1,174,000	1,076,000	1,174,000	881,000
Increase in annual amount by	245,000	245,000	245,000	147,000	—	—
C. Recurring expenditure—†						
Augmentation of the annual increase, foreseen in the sums required calculated in 1908, by £196,000 each on the average, graduated according to probable requirements ..	147,000	293,000	440,000	685,000	930,000	1,174,000
Totals, A to C ...	734,000	1,370,000	1,859,000	1,908,000	2,104,000	2,055,000
From which an increase in the demands on the ordinary revenue results, as compared with the previous year, of	734,000	+636,000	+489,000	+49,000	+196,000	-49,000

NOTE.—The Navy Estimates for 1917, it is calculated, will amount to £22,651,000, including the additional sum required under the Amendment. That is to say, £98,000 less than the sum of £22,749,000 for the current year (1911) as calculated when the Law was amended in 1908 (which includes a further sum of £166,000 due to the increase of pay sanctioned in 1909).

† In consequence of the projected increase in the wages of the men, the sums quoted for recurring expenses will each be augmented by £49,000 from 1913, inclusive.

UNITED STATES.

HEAVY OIL ENGINES.

The oil engines in submarines "E 1" and "E 2" are of interest, says the *Marine Review*, for the reason that they are the first heavy oil engines which have ever been used in the United States Navy, and, so far as known, the first on the Diesel principle ever used for marine purposes in the United States. An explosive mixture is not used in these engines. On the compression stroke the cylinder is filled with pure air, which is compressed to about 500 pounds pressure per square inch. Due to this sudden compression the temperature of the air is raised to approximately 1,000 degrees Fahr. At the end of the compression stroke, fuel (practically any form of oil may be used) is sprayed into this hot air, and on coming in contact therewith is burned. This further raises the temperature of the air inside the cylinder, so that on the return stroke it expands under approximately constant pressure, so long as the fuel is sprayed in, which is generally about 1-10 of the stroke. As soon as the fuel spray valve is closed, combustion ceases and the hot air and products of combustion then expand to the end of the stroke. Working on this principle, carburettors and ignition devices are dispensed with. The control of the engines is obtained by the regulation of the amount of oil which is sprayed into the cylinders. The principal advantage is economy. On the average the fuel consumption is about one-half pound of fuel per brake horsepower hour. The fuel used is generally "fuel oil," which is a residue from oil refineries, left over after all the more valuable commercial products have been removed. It can be bought for from two cents to four cents per gallon, and is generally regarded as the cheapest form of motive power. There are other economies that relate to attendance and upkeep.

For naval purposes the safety of these engines is mentioned as an advantage, especially in submarine boats, where the use of a volatile liquid, like gasoline, is attended with considerable danger. But the most important saving is in weight, both in fuel and power, and the consequent increased radius of action, or increased armour and armament. For the above reason practically all Governments interested in submarines decided on the adoption of oil engines, within the past few years, and the oil engines in "E 1" and "E 2" are only the first of a considerable number of submarines now building which will be equipped in a like manner.

"E 1" and "E 2" are twin screw vessels, each having a pair of four-cylinder four-cycle non-reversible engines. The boats are also equipped with powerful electric motors and storage batteries. For manœuvring it only becomes necessary to switch in the motor for going astern or quickly going ahead. Some recent engines, however, working on the two-cycle principle, have been made reversible, and will be installed in the later boats. The engines have developed 300 I.H.P. each when running at 400 revolutions per minute.

Army and Navy Journal.

IMPERIAL DEFENCE.

Committee of Imperial Defence.

The Prime Minister gave the following information regarding the Imperial Defence Committee in a statement in the House of Commons on the 25th July.

FUNCTIONS OF THE COMMITTEE.—The functions of the Committee of Imperial Defence have no reference to policy, which is determined by the Cabinet, nor is the Committee in any sense an executive body. Its business is to give advice, from time to time, in regard to all strategical and tactical questions to the Government and the Departments concerned.

WORKING OF THE COMMITTEE.—The full Committee meets on an average not more than six or seven times a year. It has been found by experience that the best way of dealing with the subjects which come before the Committee is to refer them, in the first instance, to a comparatively small number of sub-committees, and then, when the sub-committees have taken evidence and reported on them, to bring up their reports from time to time for consideration by the general Committee. There are now four of these permanent sub-committees, which are practically in constant session: viz. :—

1. *The Home Ports Defence Committee* which deals with questions affecting the defence of our coasts, rivers and home ports. It meets under the presidency of the Secretary of the Imperial Defence Committee, and during the last 12 months has presented to the full Committee no less than 25 reports which have received the approval of the Admiralty and of the War Office, and in regard to most of which effect has already been given. Speaking generally, the duties of this Committee relate to the best means for defending all the vulnerable points of the United Kingdom.

2. *The Overseas Defence Committee* (formerly the Colonial Defence Committee).—This Committee has, in the last two years, dealt with a large number of questions of defence affecting the Crown Colonies, self-governing Dominions, Egypt, and the defended ports of India; all of its reports have been considered by the full Committee and by the various authorities concerned.

3. *The Committee for the Co-ordination of Departmental Action on the Outbreak of War.*—This sub-committee, which is composed of the principal officials of the various departments of State, has compiled a War Book, which definitely assigns to each department, including the War Office and Admiralty, the Home Office, the Foreign Office, the Board of Trade, etc., its responsibility for action under every head of war policy. The departments themselves, in pursuance of the instructions given by the War Book, have drafted all proclamations, Orders in Council, letters, telegrams, etc., which can be foreseen. Every possible provision has been made to avoid delay in setting in force the machinery needed in case of war. It has been found necessary to make this Committee permanent, in order that these war arrangements may be constantly kept up to date.

4. *Air Committee*.—This Committee deals with all matters of aerial navigation, both naval and military, in case of war.

Non-Permanent Sub-Committees.—In addition to the above permanent organizations, special sub-committees are appointed, from time to time, to deal with particular matters.

(i) Of these, one presided over by a Secretary of State for War deals with *Local and internal transportation* (that is between different parts of the United Kingdom) and the *Distribution of supplies in time of war*.

(ii) Another sub-committee deals with *Oversea transport and reinforcements* in time of war.

(iii) A third sub-committee is organizing the *Wireless Telegraphy service* throughout the Empire. It is hoped that soon there will be a continuous system of wireless telegraphy, of which the governing stations will rest on British territory (or territory in British occupation) and which will extend from one end of the Empire to the other without any stations on foreign soil.

(iv) Another Committee deals with the *Control of the Press* and the *Censorship in time of war*;

(v) And another with the *Maintenance of Oversea commerce in time of war*.

There are also other special sub-committees which were not enumerated.

The elastic organization of the Imperial Defence Committee enables it to draw on practically the whole of the public service and, from time to time, to take into its council persons who are not connected with the public service at all (e.g., gentlemen connected with Lloyds, with the great railway companies, and with other great commercial organizations).

In the year 1911 a meeting of the Committee of Imperial Defence was attended by five Prime Ministers of the self-governing Dominions. On this occasion a statement was made by the Secretary of State for Foreign Affairs as to the general course and direction of British foreign policy; the relations between Great Britain and other Powers were fully disclosed to them with reference to the way in which they must affect the naval and military situation. This was followed by an equally full statement from the First Lord of the Admiralty with regard to the naval policy, and from the Secretary for War with regard to military policy. The points discussed included the comparison of the naval forces of the United Kingdom with those of the Dominions; the status of the Dominions' fleet; the flag to be flown by them and the representation of the Dominions on the Committee of Imperial Defence; and also the possibility of each of the Dominion Governments setting up some corresponding body to which strategic questions might be referred. In July of this year, members of the Canadian Cabinet, including the Prime Minister, Mr. Borden, have attended a meeting of the Imperial Defence Committee and heard statements from the Foreign Secretary on foreign policy and from the First Lord of the Admiralty on the naval situation.

COST OF COMMITTEE.—The total annual cost of the Imperial Defence Committee is as follows:—

The Secretariat, which includes Secretary, four assistant secretaries, and the necessary confidential clerks costs £3,200. The cost of the Historical Section is £1,950. The total expenses are a little over £5,000 a year.

MILITARY NOTES.

BRITISH EMPIRE.

Home.

EXAMINATIONS IN MILITARY HISTORY.—The campaigns and special periods on which papers will be set at the examinations stated are announced in Army Orders as follows:—

(a) *For Commissions in the Regular Army* (candidates from the Special Reserve, Militia, Territorial Force, Universities, and military forces of the self-governing Dominions and Crown Colonies), under the Regulations issued with Army Orders 19 and 44 of 1912.—**October, 1915, and March, 1916.** *First Paper.*—The Napoleonic Campaign of 1806, from 9th August (issue of Prussian orders to mobilize) to 8th November (the fall of Magdeburg), both dates inclusive. *Second Paper.*—Special period—the operations between the 10th and 14th October, 1806, both dates inclusive. *At the October, 1915, examination alternative papers on the campaign set in March, 1915, will be set for University and Colonial candidates only.*

(b) *Captains and Lieutenants for Promotion.* King's Regulations, Appendix XI., (d) (iv).—**December, 1913** (at Home and Abroad, except India). **March, 1914** (in India). **Set for the second time.** *First Paper.*—The Shenandoah Valley Campaign, from April, 1861, to June, 1862, both inclusive. *Second Paper.*—Special period, 16th May, 1862, to June 9th, 1862, both dates inclusive.

December, 1913 (at Home and Abroad, except India). **March, 1914** (in India). **Set for the first time.** *First Paper.*—The Campaign in Bohemia, 1866, to the battle of Königgrätz, inclusive. *Second Paper.*—Special period, "The battle of Königgrätz, 30th June, to 3rd July, 1866, both dates inclusive."

(c) *Admission to the Staff Colleges* (Voluntary). **June, 1913** (Camberley Staff College). **October, 1913** (Quetta Staff College). *First Paper.*—

(a) The Crimean War, excluding technical details of the siege of Sevastopol. (b) "Small Wars, their principles and practice" (Colonel Callwell). *Second Paper.*—The Russo-Japanese War, up to the battle of Liao Yang, inclusive.

"BOARDED-OUT" HORSES.—It is officially announced that, with a view to extending the system under which horses from cavalry regiments are "boarded out" with private individuals, the Army Council have decided to remove the restriction under which horses could only be "boarded out" at places within a day's march of the station of the regiment. The revised conditions under which cavalry horses are "boarded out" may be summarized as follows:—

Applications for horses should be made to the commanding officer of the nearest cavalry regiment, or to the Secretary of the War Office. A month's trial is allowed, and every endeavour is made to provide the applicant with a suitable horse. After being finally accepted the horse must be kept for at least 12 months; it must be well fed and stabled, and must always be kept in hard condition, so that it could, in case of emergency, at once take its place in the ranks. The person with whom the horse is "boarded out" must insure it and lodge the insurance policy with

the commanding officer of the regiment supplying the horse. All "boarded-out" horses are liable to be called in for military training once in every two years, for a period not exceeding one month, a notice of at least a fortnight being given in each case. Expenses of transit are paid by the War Office. The horses will also be inspected by an officer from time to time, as may be considered necessary.

It is hoped that when these conditions become more widely known, many persons who would like to obtain the use of a good horse on easy terms will avail themselves of the opportunities afforded by the "boarded-out" system.

STRENGTH OF THE TERRITORIAL FORCE.—It was officially stated in Parliament that the strength of the Territorial Force on the 1st July was 261,000 N.C.O.'s and men, an increase of 63,012 from October 1st. In the April-June quarter 25,409 recruits had joined, as compared with 14,809 in the corresponding quarter of 1911, but the discharges had been 24,014 as compared with 10,944 in the corresponding quarter of 1911; this increase in discharges was due to the fact that many of the Volunteers had been transferred to the Territorial Force on a four years' engagement, which had just concluded. The average strength of Territorial Divisions was 86% of the establishment, but some divisions had 90%, and one 97%.

NATIONAL RESERVE.—The Secretary for War stated in Parliament, on the 17th July, that the War Office regarded the National Reserve as a military asset of the greatest value; they proposed to encourage the National Reserve to perfect its own organization, but they did not want it to become a Third Line Army. They would welcome the further organization of the Reserve, provided it was fully understood that that would not be their fighting organization in war. If every member of the National Reserve would undertake an obligation, in the event of a grave national peril, to place himself at the disposal of the military authorities within these islands, this would be of real value to the State.

India.

ABOR EXPEDITION.—The following summary of the results of the Abor Expedition is contained in a despatch from Major-General H. Bower, C.B., to the Chief of the General Staff at Simla, which appeared in the *London Gazette* on the 16th July:—

Probability of Abor Coalition.—Previous to the advance of the force information pointed to the great probability that we would not only be opposed by the Minyong, but that several other tribes would coalesce with those responsible for the massacre in opposing our advance, and from information obtained afterwards it appears that very many villages assisted in the preparation of stockades and stone shoots. It was soon, however, apparent that the tribes who promised their support to the Minyong had done so under the belief that the punitive force would be on the small and insufficient scale that has been such a marked feature of former expeditions against the Abors. As soon as our strength became manifest the coalition fell to pieces, and the guilty villages were left to fight out their own quarrel with us alone. This materially reduced the active opposition.

Physical Difficulties.—On the other hand, the physical difficulties of the country presented even a greater obstacle to rapid advance than had been anticipated. The Abor paths were quite unfit for use by laden carriers, and as an example of the difficulties encountered I may mention that a small exploration party leaving camp soon after daylight only

completed a march of $1\frac{1}{2}$ miles by 4 p.m. Many other cases showing the difficulty of rapid movement could be quoted, and the necessity for searching out and destroying stone shoots, of which an incredible number had been prepared, also involved delay.

Results.—As the result of the operations the culpable villages have been punished, six men who took part in the massacre of Mr. Williamson's party have been captured, tried, found guilty, and sentenced. The rifles taken have been restored, and our capability to punish evildoers, which hitherto has not been credited, has been brought home to the tribesmen. Practically the whole Abor country has been visited, and excellent relations established. The domination exercised by the Kebang-Rotung group of villages has been broken, the villages in the interior can now trade with India, which they express a great desire to do. The part of the north Lakhimpur Districts lying to the north of the Brahmaputra can be recolonized, there being nothing to fear from Abor raids.

Mule Roads.—A good road fit for mules has been constructed from Kobo to Yambung, and Abor paths improved as far as Shimong and Riga and between Mishing and Kalek.

Survey.—The absence of maps, native information being often misleading, was a difficulty. In spite of the fact that the weather could hardly have been less favourable than it was for surveying, the following results were obtained:—

(a) An accurate series of triangulation, emanating from the Assam Longitudinal series of the Great Trigonometrical Survey, has been carried over the outlying ranges to the latitude of Kebang, terminating in the base Sadup h. s. Namkam h. s. This will prove of the greatest assistance to future surveyors or explorers.

(b) From this series and an extension of reconnaissance triangulation to the latitude of Simong several large snowy peaks have been fixed on what appears to be the main Himalayan divide, including one very fine peak over 25,000 feet high. Many more snow peaks have also been fixed on the watershed between the Dihang and Subansiri rivers, which seems to be a very prominent spur of the main divide. It has only been possible to obtain a mere approximation of the topography of these snowy ranges, but the geodetic results are in themselves of great value.

(c) About 3,500 square miles have been more or less rigorously mapped on scale four miles=one inch, including the whole of the Yamme and Shimang Valleys, a portion of the Siyom River, and the whole of the Dihang Valley as far north as Singging. Although I venture to think it is now possible for very small parties to travel about the country, it was found necessary, in the first instance, that exploring parties showed strength. In addition to reasons of safety a considerable number of men were required to clear hill tops.

Conduct of Troops.—Campaigning in a country where the difficulties of transport are so great necessarily involved considerable hardships on the men, and great extremes were experienced from tropical heat to bivouacking in snow. In one place this was lying nine feet deep. The continuous bad weather experienced during part of the operations was a greater hardship than it would be in a campaign on which tents could be carried. The work was hard, unrelenting, and continued watchfulness was required against an enemy ever ready to take advantage of an opportunity. Difficulties of exploration were accentuated by the impossibility of columns living on the country. The Abors grow only sufficient

rice for their own consumption, and are most unwilling to part with it. Unhusked rice was obtained occasionally, and considerable labour was required to husk it. I cannot speak too highly of the conduct of all ranks under trying circumstances, and trust that the operations will meet with the approval of His Excellency the Commander-in-Chief.

BELGIUM.

GENERAL ELECTION.—The result of the General Election was a crushing defeat of the Liberal Socialist opposition by the Clerical party. The new Chamber consists of 101 Clericals, 45 Liberals, 38 Socialists, and two Christian Democrats, giving a Clerical majority of 16 as against six in the former Chamber. The Senate consists of 54 Clericals, 31 Liberals and eight Socialists, giving the Clericals a majority of 15, as against 13 in the last Senate. The total Catholic majority was 82,772 as compared with 70,640 in 1908. This result was unexpected, as the Catholics have been in power for 28 years, and a change in Government was anticipated.

As a consequence of the elections serious disturbances broke out in the Walloon country, where the Liberal-Socialist element predominates, five persons being killed and 50 wounded in Liège and Verviers alone.

The fact that the Catholic party has retained office makes it unlikely that any material change will be made in the military policy or organization of the country.

Belgian Congo.

SUPPLEMENTARY CREDIT TO 1911 BUDGET.—The following supplementary credits have been voted for the 1911 budget:—Ordinary Expenditure, £19,115; Extraordinary, £160; total, £19,275. Out of this sum, £2,000 is allotted to navigation, £1,600 to the post and telegraph service, and £720 to armament.

FRANCE.

ARMY MANŒUVRES.—Army manœuvres will take place from the 11th to 18th September in the area Saumur, Bressuire, Chauvigny, Tours. The opposing forces will consist of:—

Eastern Army: Commander, General Marion. *Troops:* 9th Army Corps; a composite corps formed of the 3rd Colonial Division and the 9th Division (5th Corps); and the 7th Cavalry Division.

Western Army: Commander, General Gallieni. *Troops:* 10th and 11th Army Corps; 1st Cavalry Division; and one brigade (three 4-gun batteries) of heavy artillery, with 155 mm. Rimmilho howitzers.

Director of Manœuvres: General Joffre, Chief of the General Staff. *Troops at disposal of Director:* One Reserve Division; two batteries fortress artillery (four 120 mm. guns and four 220 mm. mortars); besides telegraph, aeronautic and engineer units. The latter will include an engineers corps park, and a section of an engineer army park. Headquarters will be at Châtellerault.

The total units taking part in the army manœuvres will be 110 battalions, 72 squadrons, and 115 batteries, as compared with 82 battalions, 64 squadrons, and 75 batteries which were to have taken part in the manœuvres cancelled last year. The 10th Corps will have 18 batteries of artillery, the 9th and 11th Corps 24 batteries each, and the Composite Corps 11 batteries, while 2 "reinforcing batteries" will be allotted to the Reserve Division. The appearance of the latter formation is, says the *Internationale Revue*, of special interest, because

it is an open secret that one such division would take the field with each first line army corps on mobilization; the Reserve Division will on this occasion consist of two brigades, composed of three 3-battalion regiments each. The participation of so strong a contingent of heavy and fortress artillery is also, according to the same authority, an uncommon event, and probably points to the inclusion of a fortress warfare scheme, and of important artillery problems in the manœuvres.

The troops will concentrate on the 9th September. The 10th, 14th and 18th will be observed as rest days; otherwise the manœuvres will be continuous. On the two last days the Eastern and Western armies will unite, and will be exercised under the command of General Joffre against a marked enemy, represented by the 9th Division.

Marocco.

GENERAL SITUATION.—The condition of affairs in the north has improved, owing to the successful operations of General Gouraud's column, and things are now better than they have been since April. In the south, there has been considerable unrest, and although matters improved at the end of the month, the general situation is unsatisfactory and threatening. At Marrakesh, there has been much alarm, owing to the disputes between El Glawi and M'tougui; at the end of the month it was reported that these rival chieftains had come to an agreement. In the Sus, the new Pretender, El Haiba, has considerably increased his influence, one of his new adherents being the Kaid of Tarudant.

MILITARY OPERATIONS : (a) *Gouraud's Column*.—The operations against the Hiayna, referred to last month, terminated with the surrender of that tribe. At the end of June, a new Pretender appeared in the Fishtala district, 25 miles N.N.E. of Fez. This man pretended to be Bu Hamara, but it is believed that he is in reality one of the Simali tribe, who escaped when the jails were opened in Fez during the mutiny last April. He collected some 2,000 followers, and established himself on Mount Mulai Bushta, a so-called impregnable stronghold 25 miles N.N.E. of Fez. There he was attacked on July 6th by a flying column under General Gouraud, consisting of four battalions, three sections of mountain artillery and some cavalry. The French surprised the Moors by means of a night march, and were entirely successful, capturing the Pretender's camp; after a further success on the 7th, part of the Sheraga submitted. This new movement appears to have been effectually nipped in the bud, although the Pretender himself succeeded in escaping. The French losses were four killed and 23 wounded; 50 dead Moors were buried.

(b) *Sefrou*.—The Ait Youssi continue to be refractory in this neighbourhood. The garrison made a successful sortie on July 10th, in conjunction with some friendly tribesmen. On July 19th the garrison was reinforced by a column of 15 infantry companies, two squadrons, three sections of mountain artillery, under Colonel Mazillier, and active operations were undertaken against the Moors at Immouzer, nine miles to the south; these were entirely successful. The French losses in these two actions were five killed and 14 wounded; the Moors are said to have lost 200 killed.

(c) *Algerian Frontier*.—General Alix has suspended operations and broken up his column. His work of pacification on the Muluya has met with success, all the riverain tribes have submitted, and in most cases have paid fines.

(d) *Other Localities.*—General Dalbiez has been engaged in pacifying the Beni M'tir, several fractions of whom have submitted. There has been renewed unrest on the Shawia border, though no serious consequences have so far ensued.

FRENCH FORCE IN MAROCCO.—At the beginning of the month, the strength of the French force in Morocco was as follows:—

				<i>White.</i>	<i>Native.</i>
Algerian Frontier	...	...	...	11,266	560
Elsewhere	...	...	...	32,050	5,651
				<hr/> 43,316	<hr/> 6,211
Total					<hr/> 49,527

Since then reinforcements of nearly 1,000 men have arrived. Five additional battalions have been asked for; it is said that these will be sent by August 10th.

GERMANY.

GERMAN IMPERIAL MANŒUVRES.—It is reported that the situation at the outset of the Imperial Manœuvres will be as follows:—The Red Force, consisting of the IIIrd (Prussian) and XIIth (Saxon) Corps will be assembled east of the middle portion of the Elbe; the Blue Force, consisting of the IXth (Prussian) and XIXth (Saxon) Corps will be assembled on the middle portion of the Saale. The manœuvre area will include the country between Torgau and Merseburg. It is believed that one of the two armies will have to effect a passage of the Elbe under service conditions.

The great cavalry reconnaissance exercises, which are to precede the Imperial Manœuvres, will commence on the 9th September; the manœuvres themselves will begin on the 11th September, immediately after the return of the Emperor from Switzerland, and will conclude on the 13th or 14th of the month.

Proposed Changes in the German Army During the Years 1912 to 1915.

The following is the detail of the new formations and increases of existing establishments which will result from the new Army Bill.

PRUSSIA: Command, Staff, etc.—One army inspection, one medical inspection, two army corps staffs, two divisional staffs, 15 Landwehr inspections, two field artillery brigade staffs, one pioneer inspection. Infantry: 11 battalions, 80 machine-gun companies, increase in the establishment of the rank and file in 96 battalions. Cavalry: One regimental staff, five squadrons. Field Artillery: Four regimental staffs, eight "Abteilungen"¹ staffs, 24 batteries. Conversion of the nine horse artillery "Abteilungen"¹ of two batteries of six guns each into "Abteilungen" of three batteries of four guns each. Increase of establishment of men in 84 batteries. Foot Artillery: One battery. Pioneers: One commander of the pioneers of one army corps, three battalions, 20 searchlight sections. Communication Troops: One wireless telegraph company, one air troop. Increase of establishment of officers and men in the motor traction battalion. Train: Two battalions (each of three companies), two train depôts. Miscellaneous additional: Two half bearer departments. Two horse inspection commissaries. Increase of establishment in men and

¹ Corresponds to a British F.A. brigade.

horses at the military riding school. Two remount dépôts. Increase of number of artillery dépôts and reinforcement of the ordnance and artificer personnel. Increase of administrative personnel, etc.

BAVARIA: Command, Staff, etc.—Four Landwehr inspections. Infantry: 12 machine-gun companies. Increase in the establishment of the rank and file in 20 battalions. Cavalry: One squadron. Field Artillery: six batteries, conversion of the horse artillery "Abteilung"¹ of two batteries of six guns each into one of three batteries of four guns each. Increase of establishment of men and horses in 18 batteries. Pioneers: One battalion staff, one company, one searchlight section. Communication Troops: One telegraph company. Conversion of the air and motor traction detachment into one air and motor traction battalion, one air company. Increase of establishment of officers, men or horses in the Railway Battalion, the wireless telegraph company, in the draught horse section of the telegraph battalion, and in the motor traction company. Train: Three companies.

SAXONY: Command, Staff, etc.—Two Landwehr inspections. Infantry: One regimental staff, five battalions, eight machine-gun companies. Field Artillery: Conversion of the horse artillery "Abteilung"¹ of two batteries of six guns each into one of three batteries of four guns each. Increase of establishment of men and horses in six batteries. Pioneers: Two searchlight sections. Communication Troops: One detachment with the Prussian Air Troop, increase of establishment of officers and men of the detachment with the Prussian Motor Traction Battalion. Miscellaneous: Increase of administrative personnel, etc.

WURTEMBERG: Command, Staff, etc.—One Landwehr inspection. Infantry: One battalion, six machine-gun companies, increase of establishment of rank and file in seven battalions. Field Artillery: Increase of establishment of men and horses in three batteries. Pioneers: One searchlight section. Communication Troops: One detachment with the Prussian Air Troop. Increase of establishment of officers and men in the detachment with the Prussian Motor Traction Battalion. Miscellaneous: Increase of administrative personnel, etc.

ALL FOUR CONTINGENTS, Infantry.—Addition of one lieutenant to the regiments and staffs of regiments, with two battalions (excluding Bavarian contingent). Addition of another staff officer to all regiments with three battalions. Addition of another captain to all regiments. Field Artillery: Addition of one lieutenant-colonel to one regimental staff of each brigade; addition of another captain to the regiments not receiving a lieutenant-colonel. Miscellaneous: Changes of organization in the Corps of Officers with a view to an improved allotment of posts in the event of mobilization. The same object is served by the creation of Landwehr inspections as in the single States.

For total number of units on the completion of these changes, see June 1912 JOURNAL, page 866.

INCREASE OF PERSONNEL.—By the Peace Strength Law of 1911 it had been decreed that, from the 1st April, 1911, the establishment of the Army was to be increased (not counting officers, N.C.O.'s over the rank of corporal, and one-year volunteers), so as to reach a total of **515,321** by 1915 and to remain at that figure until the expiration of the term of five years at the end of March, 1916.

As a result of the passing of the Defence Bills, this total is now to be altered to **544,211**, an increase of **28,890**.

¹ Corresponds to a British F.A. brigade.

The calculation as to what extent the population will be called on to supply the augmented peace strength is based on the results of the census of 1910. The following table shows a comparison between the numbers and percentages to be called up in accordance with the Law of March, 1911, and the present proposals:—

State.	Census of 1905.	Peace Strength according to Law of 27.3.11	Percentage.	Census of 1910.	Peace Strength according to new proposals.	Percentage
Prussia, etc.	47,306,126	399,026	·843497	50,794,467	420,939	·828710
Bavaria	6,524,372	57,133	·875686	6,887,291	60,351	·876266
Saxony	4,508,601	39,911	·863039	4,806,661	41,625	·865986
Württemberg	2,302,179	20,251	·879645	2,437,574	21,296	·773656
German Empire.	60,641,278	515,321	·849786	64,915,993	544,211	·838202

It will be observed that the proportion remains very much the same. The slightly increased burden on Bavaria, Saxony and Württemberg as compared with that on Prussia will, it is stated, be scarcely perceptible and will moreover be equalized by additional demands on Prussia for recruits for the Navy.

HOLLAND.

DISCIPLINARY DEPÔT.—This depôt has been abolished, and certain units of each arm have been detailed to receive soldiers who would formerly have been sent to the depôt for punishment.

CABLES.—The Netherlands East Indian Cable between Kubudjati, near Singaradja (Bali), and Ujungtanah, near Macassar (Celebes), has been removed from Bali and landed in Java at Landangan, near Situbondo, and thus now forms a cable from Java to Celebes. A second cable between Anjer (Java) and Kalianda (Sumatra) has been laid, and also a new cable between Padang (Sumatra) and Siboga in the same island.

WIRELESS TELEGRAPHY.—A new wireless telegraph station has been opened at Balik Papan (Borneo), and communication obtained with Situbondo.

PORTUGAL.

ROYALIST RISING.—A Royalist incursion into the provinces of Minho and Traz Os Montes took place in the beginning of July. The invaders, who had been collecting together in Spain, intended to enter Portugal in three columns simultaneously, from Galicia, Ciudad Rodrigo, and Badajos. As soon as this occurred, the garrisons of Oporto, Braga, Braganza, Vizen, and Lamego were to declare for the King, and an outbreak was to take place at Lisbon. On July 7th, a Royalist band, 200 strong, crossed the Minho, seized the railway station at Valença, and attacked the town. The invaders were driven back, crossed the river at Tuy, and most of them were disarmed by the Spanish "Civil Guards." There were about 50 casualties in the attack at Valença. At the same time Captain Couceiro, with from 500 to 700 men, appeared before Montalegre, 50 miles

north-east of Braga, and summoned it to surrender. No notice was taken, and Couceiro marched off to Chaves, 20 miles south-east, and began bombarding it early on the 8th.

Some of the garrison, principally artillery, had marched off to Montalegre, but they returned before Couceiro could take Chaves, and he was compelled to retreat towards the frontier, where another engagement took place with the Government forces at Soutelinho, in which 173 Royalist prisoners were taken.

A Royalist outbreak had also been planned at Torres Vedras, but troops were sent and the affair prevented.

The Government called out the reserves of the 1st, 2nd, 5th, and 16th Infantry Regiments, and the 1st and 3rd Groups of Artillery, in connection with the disturbances.

The Royalists appear to have dispersed by the third week in July, and the movement is at an end for the present. The raids cost the Government about £440,000, and 5,417 troops in all were mobilized.

Portuguese Colonies.

COLONIAL FORCES.—In view of the unrest in the Portuguese Colonies and the small number of European troops there at present the Government proposes to station a force of infantry permanently in Macao, Guinea, and Timor, and artillery in Angola and Mozambique. The length of service will be two years.

PORTUGUESE EAST AFRICA.—It is stated in the Press that the Chamber of Deputies has finally approved, without opposition, the contract entered into between the Portuguese Government and the British Central Africa Company for the construction of a line of railway through Portuguese territory, from the Zambesi to Port Herald, the present terminus of the Shire Highlands railway in British Nyasaland. The line is about 70 miles in length, and will be of 3 ft. 6 in. gauge. It will run along the bank of the Shire River and touch the Zambesi at Kaia, to which place the Zambesi is navigable all the year. The British Government is guaranteeing 4 per cent. interest for a period of ten years on £500,000, the cost of the line.

ANGOLA.—It is stated in Lisbon that a serious native revolt has broken out in Benguela, which has not been repressed, and that the general situation is most unsatisfactory.

SPAIN.

ARTILLERY REORGANIZATION.—The present Artillery Regiment of Melilla is being reorganized, and will be called the Mountain Artillery Regiment of Melilla.

The regiment now consists of:—

Mountain Artillery.—Two batteries 1st Regt., one of the 2nd, three of the 3rd, and ammunition columns of the Heavy Artillery Regiment. These units are detached from the corps in Spain.

The new regiment will have a strength of 69 officers, 2,193 rank and file, 1,139 horses or mules, 36 guns, 720 boxes of ammunition, 18 ammunition wagons, nine 2-wheeled carts, six baggage wagons,

This new formation will not increase the mountain artillery in the Spanish Army, which will be:—

1st Regiment: Three batteries. (Peace establishment of a battery: Three officers, 141 men, 56 horses or mules, four guns). One Cadre battery

(on paper only). One Dépôt battery (one officer, four men, one horse, no "matériel").

2nd Regiment: One battery at Larache. (War establishment eight officers, 200 men, 99 horses or mules, four guns). One battery at Melilla. (Ditto.) One battery. (Peace establishment: Three officers, 192 men, 56 horses or mules, four guns). One Cadre battery (on paper only). One Dépôt battery (one officer, four men, one horse, no "matériel").

3rd Regiment: Two batteries, two Cadre batteries, one Dépôt battery. Composition as already given for the other regiments.

STATIONS OF THE ARMY.—According to the present distribution, the greater part of the army in Spain is stationed in those parts of the country about Madrid, Valencia and Seville.

SPANISH NORTH AFRICA.—According to the Spanish Press the death of El Mizzian (referred to in the JOURNAL for June, 1912) has demoralized the Moors, and now that the famous agitator is dead, many of the tribesmen have returned to their homes.

EL BARACA, the successor of El Mizzian, has submitted to the Spaniards.

TANGIER—FEZ RAILWAY.—According to the Press the agreement referring to the Tangier—Fez railway was signed at Madrid on the 13th July.

The principal conditions are:—

1. The construction and working of the Tangier—Fez railway are entrusted to a Franco-Spanish company.

2. The capital will be about 60 per cent. French and 40 per cent. Spanish, with power on the part of France and Spain to acquire the proprietorship of the line within their respective zones once it is constructed.

3. Public tenders will be invited for the construction and subsequent working of the line. The company will make a detailed survey of the route and will then allot contracts in sections of 20 kilometres, in accordance with the Franco-Spanish agreement.

4. Of the capital 8 per cent. will be reserved as a concession to foreign subscription.

5. The points through which the railway may have to pass will be designated by each Government within its respective sphere.

NAVAL AND MILITARY CALENDAR.

JULY, 1912.

- 4th (Thurs.) Meeting between the German Emperor and the Tsar at Port Baltic.
- 8th (Mon.) Capture of Misurata (Libya) by the Italians.
- 9th (Tues.) Official visit of Members of Parliament to the Fleet assembled at Spithead.
- 19th (Fri.) Raid by Italian torpedo boats on the entrance to the Dardanelles.
- 21st (Sun.) Capture of Prishtina by the Albanian insurgents.
- 22nd (Mon.) Centenary of the Battle of Salamanca.
- 29th (Mon.) Statement in Parliament by First Lord of the Admiralty on British Naval construction programme.
- 30th (Tues.) Death of His Majesty Mutoshito, Emperor of Japan, after a reign of 44 years.

AERONAUTICAL NOTES.

GREAT BRITAIN.

AERIAL RECONNAISSANCE DURING AN ATTACK.—On the 27th June, two aeroplanes co-operated with the 3rd Division in an attack on a position during combined field firing. In his report on the exercise the G.O.C. 3rd Division observes that:—

“The officers of the Flying Corps deserve much credit for their courage in making an ascent under difficult and dangerous conditions. They sent in four messages relating to the position of the enemy's artillery and to observation of our own fire. The information contained in them was accurate and would have been most valuable had it been rapidly transmitted through Divisional Headquarters to the artillery units who were engaging these objectives. It is most necessary to devise some means of rapid communication between the aerial observer and the fire unit commander of the guns in action. This can probably best be done through the headquarters of the division, for the G.O.C., R.A., is the only person who knows the tasks and zones which have been allotted to the various artillery units.

The most pressing need at the moment is a satisfactory code of signals between the aerial observer and the Artillery commander. The solution can only be the result of experiment, and several methods have already been tried. It is possible that the need may eventually be supplied by wireless . . . but the fact remains that the success of aerial observation and reconnaissance depends chiefly on the rapid transmission of the information acquired, from the aeroplane, to the officer who is in a position to take full advantage of it.”

The G.O.C.I.C. Southern Command adds, in his comments on the field firing, that the aeroplanes brought down excellent information as to where the shells were bursting—information which, although mostly too late for the day's operations, would have been in ample time in a real battle, where a day or two would probably have elapsed before an assault on the position could have taken place.

FATAL ACCIDENT ON SALISBURY PLAIN.—We regret to record the death of Captain E. B. Loraine (Grenadier Guards) and Staff-Sergeant R. H. V. Wilson, both of the Royal Flying Corps, through an aeroplane accident on Salisbury Plain on the 5th July. Captain Loraine was piloting the machine, a Nieuport monoplane, and carried Staff-Sergeant Wilson as passenger. When flying at a height of 400 feet a somewhat sharp turn was attempted, and the machine side-slipped and dived at a steep angle, striking the ground with results fatal to both airmen. Captain Loraine had experienced a rather similar side-slip earlier on the same day, when flying at a height of 1,000 feet, and had then been able to correct the movement.

AUSTRIA-HUNGARY.

AVIATION.—An influential committee has been formed in Austria for the creation of a national “Air Fleet.” Prince Furstenstein is president, and the members include Austrian Cabinet Ministers together with leading scientists and men of commerce.

Three naval officers have been sent to study aviation at Wiener Neustadt.

FRANCE.

DIRIGIBLES.—A new dirigible, "Clement Bayard III," has passed its tests, and will now take its place in the Army Aerial Fleet under the name of Dupuis-de-Lôme. This airship left La Motte-Breuil on the evening of July 16th at 8.20 p.m., and soared over Paris till darkness fell; it then was steered by compass to Nantes and the mouth of the Seine, passing over Havre and Dieppe, and made a naval reconnaissance. As day dawned its head was turned towards Paris via Rouen and Compiègne and it descended at La Motte-Breuil after having been 16½ hours in the air, during which time it accomplished 440 miles.

BOMB DROPPING.—The bomb-dropping experiments still continue; one competitor operating alone succeeded in dropping ten out of 15 bombs on the target, while another, with an assistant piloting his aeroplane, hit the target 11 times out of 15.

MONOPLANE RECORD.—Lagagneux, on a Zeus monoplane, with a passenger, flew 77½ miles in an hour, creating a new record for 10, 20, 30 and 100 kilometres, as well as for one hour's flight.

MILITARY AIRMEN.—At the end of June, Colonel Hirschauer, permanent inspector of aeronautics, stated in Parliament that he had received 1,800 applications to join the Aeronautic Corps. He also said that during the first six months of 1912 the number of accidents had been the same as for the last six months of 1911, but that the number of pilots flying and the number of kilometres covered had been double. Further, the present number of military aviators was 250.

It seems probable that 200 of these are actually flying.

GERMANY.

DIRIGIBLES.—The "Victoria Louise" continues to practise oversea cruises; on the 5th July she sailed from Hamburg to Fohr, in the North Frisian Islands, returning via Sonderburg, Alsen and Kiel. The outward trip occupied four hours and the return trip four and a half hours. On the 14th July she sailed via Kiel and Sonderburg to Arö, a Danish Island at the south of the Little Belt, returning across the sea to Wismar and thence to Hamburg, a total distance of 350 miles, of which 100 miles were over the sea.

The "Schütte Lanz" has been making some long flights in the Rhine valley, including one from Mannheim to Cologne in four and a half hours.

The Observatory on Board the "Schwaben."¹

From the Scientific American, May 4th, 1912.

That practical genius of the Germans which causes the prompt transmutation of newly discovered scientific truths into terms of concrete utility has just received a fresh exemplification at the instance of Director Colsman, of the Zeppelin construction and transportation companies.

Under his orders the magnificent new airship "Schwaben" has had partitioned off from one end of the passenger cabin a small room elaborately fitted with appliances for the making of scientific and technical experiments while *en route*, in other words a "midair laboratory."

¹The dirigible "Schwaben" was destroyed by an accident on the 28th June, 1912.

The improved manner in which dirigibles are now operated insures flight as a rule over a definite course and at a fairly constant altitude. Such comparative uniformity of conditions permits the keeping of an aerial log, and the determination of various problems in regard to the various factors, internal and external, which affect flight. The midair laboratory offers advantages for the study and solution of such problems, obviously superior in many important respects to the facilities provided on *terra firma* either in workshop or in the university, since the investigator is in a position constantly to "check" his preconceived theories by the observation of actual facts.

The passenger cabin on the Zeppelins is built upon an enlargement of the gangway running between the rear and forward gondolas. On the "Schwaben" the laboratory is a small but comfortable room communicating with the cabin by a door and containing a single one of the seven windows visible from the outside. The floor space is about 100 square feet, and a photograph of the interior shows not only scientific instruments, but a comfortable easy chair, and the tap of a water tank with a porcelain sink beneath.

Remarkable success of construction has been attained, as proven by the fact that the familiar disadvantages of dirigible travel, the noise of motors and propellers, the strong draught, and the vibration, have been almost entirely eliminated. Moderately sensitive instruments, such as galvanometers and electrometers can be used without precautions, and telephone sounds can be heard plainly without covering the free ear, while mere whispers can be detected with the free ear closed.

It is to be expected that this laboratory will throw light on a great variety of questions, meteorological and otherwise, such as the effects of sunlight, of warmth and humidity, the variations of wind-pressure, and direction of air currents, but its chief aim at present is the investigation of atmospheric electricity and wireless telegraphy, with special reference to the use of the latter as a means of directing the airship by night or in thick weather.

As respects the former, it is of special importance to learn how such a great airship is affected as it passes through the local magnetic field, and the inherent possibilities of receiving or giving off an electric charge. Professor Dieckmann, an authority on these subjects, says, "Conditions in this connection are not so simple as has been hitherto supposed. Among other things a complication appears to arise from the fact that the exhaust gases of a gasoline motor leave the exhaust charged positively and the airship negatively. At the same time the exhaust gases effect an increased conductivity of the air."

The apparatus used in these experiments is very simple, consisting of an "equalizer" fixed to the body of the aircraft, and projecting on rods into the air above and below, these, of course, being carefully insulated. The "equalizer" consists merely of a plate of platinum covered with radium, and this little "equalizer" quickly takes the potential of the surrounding space. The differences of potential are then read by means of the electrometer. These differences are by no means small, for the "equalizer" underneath the ship often runs as high as 1,000 volts per meter.

The overhead differences run much smaller, so much so that there is practically no danger of a spark. By a similar simple device, the "storm-indicator," the observer is warned of abnormal electrical conditions in the neighbourhood of the ship at any portion of its course.

The experiments with wireless telegraphy in the flying laboratory are even more interesting and important. They have two main objects, the sending of meteorological advices, or weather-warnings, and the elaboration of a definite system for indicating the direction of movement through the air, so that in rain, mist, fog, or starless nights the pilot may be able to find his bearings and keep to his course.

Such a system has already been worked out and was successfully employed in a flight made last August.

The principle is exceedingly simple, and may be stated as follows:—The energy radiated from any wireless sending station calls forth a response at any given receiving station directly proportional in strength to the distance of the latter. The receiving of messages, however, is usually by the ear; consequently the distance is directly proportional to the loudness of the sound. The comparative loudness of the sound is measured by an ingenious little device called a distance meter. This consists merely of an ordinary instrument for measuring electrical resistance, connected in parallel with the telephone, and provided with a linear scale in which zero stands for the point at which sounds cease to be audible. The divisions of the scale indicate the intensity of sound at given distances. If now not less than three land stations using the same wave-length send signals to the airship, one after the other at brief intervals of time, the spatiometer will show the distance of each station, and likewise their relative distance. By consulting a chart it is very easy to calculate from these data the latitude and longitude of the ship, and likewise by repeated measurement both the speed and the course of the dirigible may be determined.

In this connection Professor Dieckmann mentions an automatic arrangement for indicating direction of movement already in operation at Gräfelfing, near Munich. Each of four sending stations, 1, 2, 3, and 4, located at the corners of a square, has a prescribed sending time. "Each station sends its place signal every five minutes for a period of one minute's duration, so that a balloon or an airship receives them in rotation at intervals of about 15 seconds, and can determine the relative intensity of sound."

We shall await with interest future developments of this novel installation of a working laboratory in a swiftly moving airship.—*Abstracted from Prometheus.*

GREECE.

AVIATION.—Three new military aeroplanes arrived in Athens at the beginning of July. Military airmen take flights daily at Phalerum. Public interest has been aroused in the progress of military aviation, and the municipality of Athens has voted a sum of money for the purchase of a fourth aeroplane.

UNITED STATES.

LOSS OF THE AKRON.—On July 2nd, the dirigible Akron exploded at an altitude of 1,000 feet, and was destroyed. The explosion is attributed to the expansion of gas due to the heat of the sun's rays. This dirigible was completed in September last, and was to have been used in the proposed attempt to cross the Atlantic.

On July 8th an aeroplane, shortly after being started at Redwood City on San Francisco Bay, bumped its airman out of his seat, flew out to sea, and was lost.

THE WAR IN THE MEDITERRANEAN.

(A) General.

Italy.

ERITHEREANS.—The 5th Eritrean Battalion has been relieved by the 1st Eritrean Battalion, and is on its way to Eritrea, by way of Rome.

TRANSPORT OF TROOPS.—According to official figures, the cost of the transport of troops and material from the beginning of the war (October, 1911), till 1st January, 1912, amounted to £514,600, and the value of the goods conveyed to £4,833,334.

The convoys despatched were as follows:—

October, 13 convoys with 50 steamers; November, 21 convoys with 59 steamers; December, 21 convoys with 43 steamers. Total, October to December, 55 convoys with 152 steamers.

During the above period, 101,389 men, 15,000 horses and mules, and some 400 guns were transported to Libya, as well as 12,000 cattle, 3,000 tons of flour, 2,000 tons of fuel, 2,150 tons of hay, and 1,500 tons of biscuits, &c.

AERONAUTICS.—All but one of the aeroplanes in Libya are said to have been either lost or damaged, though no doubt the machines will soon be replaced.

Turkey.

SMYRNA.—In expectation of an Italian attack, the Turkish Infantry Division in Smyrna was reinforced by another division from Constantinople, and by the *Redifs* of the '84 and '89 year classes from the Konia, Ushak, Aidin, Smyrna and Denizli Divisions; in the middle of June, this force amounted to 80,000 men, under Mahmud Muktar Pacha.

DARDANELLES.—The troops assembled round Gallipoli for the defence of the Dardanelles forts on the land side, amounted, in the middle of June, to 30,000 men under Risa Pacha, Inspector-General of Artillery.¹

(B) Operations in the Aegean.

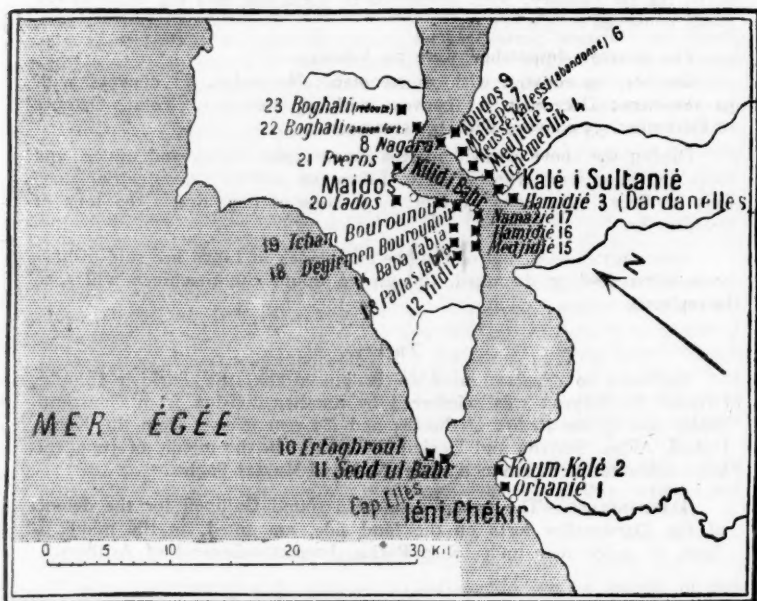
At midnight on Thursday, 12th July, an Italian torpedo flotilla, consisting of the "Spica," "Astora," "Climene," "Centauro," and "Perseo," under Commander Millo, entered the Dardanelles with the object of attacking the Turkish fleet which was anchored above the narrows. The intention was that the three first-named torpedo boats should attack the outermost warships, while the two others were to run in and among the fleet. The torpedo boats are variously said to have arrived as far as Saghanli Dere (two-thirds of the distance from the entrance to the narrows), or as far as the narrows themselves, where they were stopped by protecting cables. In the subsequent retirement, the Turks claim to have sunk two of the flotilla, but this is not confirmed. The reports of the incident were at

¹ *Marine Rundschau.*

first discredited in Rome, but on the 21st July the following statement was made public:—

"At midnight on Thursday a squadron composed of the torpedo boats "Spica," "Centauro," "Astore," "Climene," and "Perseo" succeeded in entering the mouth of the Dardanelles. The "Astore," which was the last in the line, was discovered shortly afterwards, and the batteries on both shores immediately opened fire upon it. The look-out at Parse-mas, a short distance further on, passed the alarm signal along, with the result that the squadron was continually exposed to the glare of about 12 searchlights. In spite of this, however, it boldly continued on its course, the vessels, which were in close formation, maintaining a speed

THE ENTRANCE TO THE DARDANELLES.



[From a map in *Questions diplomatiques et coloniales*.]

0 5 10 15 Miles

Names of Forts on the above sketch.

ASIATIC COAST.

- 1 Orhanié; 2 Koum-Kalé; 3 Hamidié;
4 Tchémérlik; 5 Medjidié; 6 Keussé-
Kalessi; 7 Mal-Tépé; 8 Nagara; 9
Abydos.

EUROPEAN COAST.

- 10 Ertoghroul; 11 Sedd-ul-Bahr; 12
Yildiz; 13 Pallas-Tabia; 14 Baba-Tabia;
15 Medjidié; 16 Hamidié; 17 Namazié;
18 Deyirmen-Bourounou; 19 Tcham-
Bourounou; 20 Lados; 21 Pueros;
22 Baghali (redoubt); 23 Boghali (fort).

of 21 knots, and keeping very close to the European shore of the Straits. When the squadron had reached a point near Kilid Bahr (the enemy's fire meanwhile was continually becoming more severe), the "Spica,"

which was leading the line of vessels, struck a steel cable. After freeing herself from this she continued her course, but immediately ran into another cable. She succeeded in getting past this also. Beyond Kilid Bahr and Chunah there was a stretch of water strongly illuminated by the searchlights, and our ships were subjected to a well maintained fire both from the land batteries and warships of the enemy. The inter-crossing of the searchlights rendered it impossible to identify the Turkish ships and equally so to ascertain their approximate position.

"In these circumstances Commander Millo deemed it useless to attempt an attack on the fleet, which would certainly have involved losses to most of our torpedo boats, and considering also that he had fully succeeded in achieving the object of his reconnaissance, he ordered the flotilla to return. Its withdrawal was carried out with the same calm and skill as characterized the whole operation, although the fire of the Turkish batteries, which had by now become even more heavy, was continued until the squadron reached Cape Helloe. Our torpedo boats sustained merely trifling damage. The conduct of the commander of the squadron, of the officers, and of the crew was for skill, courage, and discipline above all praise."¹

In a later report it is added that all the boats except the "Centauro" were hit, though none were damaged seriously.

(C) Operations in Libya.

Zuara Region.

SIDI SAID.—At the end of June the two main encampments of the Italian force in this section of the theatre of war were at Macabes, on the Peninsula, and at Fort Bu Kamesch or Ferua (Forwa) as it is now called. The advanced Italian trenches on the Peninsula were about four-and-a-half miles from Sidi Said; Fort Ferua is about five-and-a-half miles from the same place. Sidi Said was strongly entrenched by the Turco-Arabs, and the line of trenches ran along some heights which rise in places to nearly 300 feet and which extend across the Macabes Peninsula and to the south of it. (See Map on page 713 of May JOURNAL.)

General Garioni decided to attack the hostile trenches, but as he expected to meet with a determined opposition he arranged his plan in three phases.

First Phase.—On June 26th he sent out a column from Macabes (on the Peninsula) which consisted of two battalions Granatieri, two battalions Bersaglieri, the 7th Erithrean Battalion, one field, one mountain, and one heavy battery (the latter with man-draught), the whole under General Lequio. This column could not make much progress, although the torpedo boat "Alcione" co-operated by firing into the enemy's rear, and General Lequio halted for the night in some of the most advanced Turco-Arab trenches which he had captured.

Second Phase.—Early on the 27th June a second column, under command of Colonel Cavaciocchi, consisting of the 60th Regiment, two battalions Bersaglieri, the 6th Battalion Erithreans, one field and one mountain battery, moved out from Fort Ferua, on the mainland, against Sidi Said; at the same time the column under General Lequio advanced along the coast. At four a.m. the first groups of the enemy were seen coming

¹ Translation from the *Times*.

out from Sidi Said and from Sidi Sultan. Fighting continued all day the left column being the most seriously engaged, and by the evening the Italians were in possession of the outer line of trenches; 500 Arab bodies are said to have been found in the trenches, while the Italian losses were 18 killed and two officers and 112 soldiers wounded.

Third Phase.—On June 28th, at dawn, General Garioni renewed his attack, assisted by fire from the "Carlo Alberto," the "Iride," and the "Alcione." General Lequio's column continued its advance on the left, while Colonel Cavaciocchi's column on the right, turned the enemy's left. At 8.30 a.m. the last Turco-Arab position had been won, and the enemy fled in disorder towards Zuara and Regdalina. Two hundred dead Arabs were found in the trenches. The Italians lost ten killed and one officer and 77 men wounded.

It is, however, to be noted that the third caravan road from the Tunisian frontier to Regdalina is still open to the Turco-Arabs.

CAPTURE OF SIDI ALI.—On the 14th July General Garioni followed up this success by a further advance to Sidi Ali, a tomb situated on a hill on the seashore about two miles east of Sidi Said, and said to have the only wells of fresh water on the Zuara road.

General Garioni left garrisons at Bu Kamesch (Forwa), Sidi Said, and on the Macabes Peninsula and divided his force into two parts, the advanced troops being under General Lequio, and the reserves under Colonel Cavaciocchi. General Lequio's force marched at three-thirty a.m. in two columns. The left column, under Colonel Agliardi, consisting of two battalions, 11th Bersaglieri, one battalion Granatieri, two batteries, and one company of Askaris, moved along the coast, while the right column, under Colonel Servici, consisting of two battalions Bersaglieri, moved along the high ground further inland. The reserve under Colonel Cavaciocchi consisted of the 60th Infantry and one battalion of Askaris.

At six a.m. the left column, after some fighting, had captured the hill of Sidi Ali. Meanwhile the right column was attacked by the Turco-Arabs coming from the direction of Zelten and Regdalina, and at the same time the enemy is said to have brought three mountain guns into action. All the Italian artillery, including the guns in the entrenched camp of Sidi Said, opened fire, and the fighting became severe, as the Turco-Arabs increased in numbers and kept on trying to envelop the Italian right; the two Bersaglieri battalions charged with the bayonet several times. By 11 a.m. the Turco-Arabs were in retreat. The Italians lost 16 killed and 73 wounded; over 300 Arab bodies were buried after the action.

Misurata (Misrata) Region.

LANDING AT BU SCEIFA.—Further details have now been published in the Italian Press regarding the landing of General Camerana's force, near Misurata, which was described on page 1028 of the July JOURNAL.

In the middle of May, seven transports were assembled at Naples, and by May 23rd-25th these transports had sailed for various Tripolitanian ports, with 3,000 men.

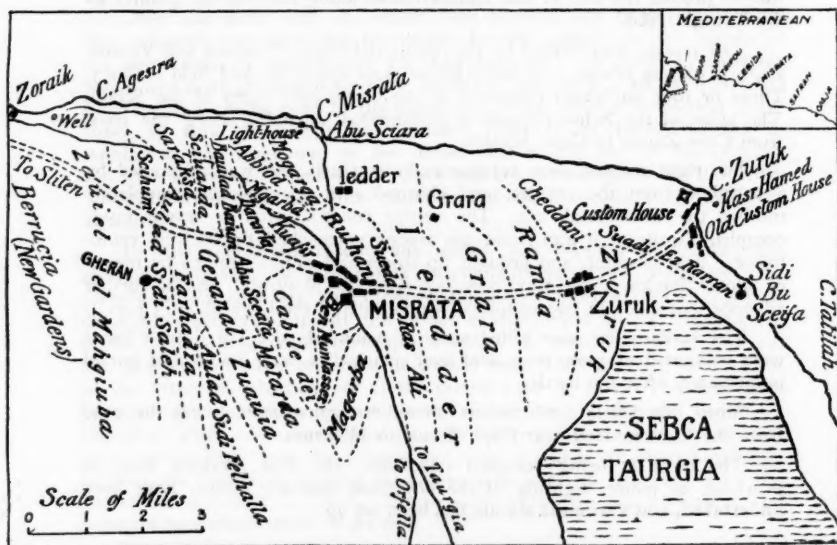
After the battle of Zanzur (June 8th), troops were embarked at Benghazi, Derna, and Tripoli; by June 12th all the transports, escorted by Admiral Borea Ricci's School Squadron, with six destroyers (which had left Italy in May), had assembled at Tripoli; on June 14th the expedition, under sealed orders, had sailed for a rendezvous 15 miles from Siliten. A

demonstration of landing was made by a cruiser and two transports off Siliten on June 15th; meanwhile the main convoy arrived at Bu Sceifa. The troops on board were, approximately, two battalions 63rd Regiment, one battalion 40th Regiment, two battalions 50th Regiment, one battalion 52nd Regiment, one battalion 37th Regiment, one or two battalions Alpini, 11th Bersaglieri, a company (or battalion?) of Eritrean troops, some artillery and engineer units, and a squadron of the Lucca Cavalry Regiment, probably about 10,000 in all.

At 3.30 a.m. on June 16th, some landing companies of seamen and a detachment of troops under Major-General Fara landed, and by 6 a.m., supported by the fire of the ships, had occupied first the Marabout of Bu Sceifa, and then the heights of C. Zuruk. About 1 p.m., the Turco-Arabs attacked the Italian right, and the action continued until 6 p.m., when the enemy retired, leaving 50 dead; the Italian losses were two killed and nine wounded.

Ninety boats and 12 rafts were used for the first landing of the Italian troops, which commenced at 7 a.m.; the disembarkation of troops and stores was completed by the evening.

MISRATA AND BU SCEIFA.



CAPTURE OF MISRATA.—On the 9th July, General Camerana followed up this success by attacking Misrata. The reports received of this battle have been very meagre, and apparently no correspondents were allowed by General Camerana to be present. The particulars given may be inaccurate in some respects, especially as regards the actual units engaged.

After the disembarkation of General Camerana's force at Bu Sceifa on June 16th, it was considered necessary to provide a secure base of operations before advancing against Misrata, which lies some eight to

ten miles west of Bu Sceifa, in the middle of a thick oasis, three or four miles from the sea. An entrenched camp was therefore made at Bu Sceifa, but while this was being prepared the Turco-Arabs also entrenched themselves on the probable line of the Italian advance, and collected as many men as possible from Siliten and from Homs.

Among other preparatory measures it is said that the Italian trenches were moved forward nearer to Misurata, and that arrangements were made for reinforcing the columns as they advanced; the reinforcements carrying food, tools, ammunition, and water, followed in rear of the fighting troops. The advance began at 3.45 a.m., in the following order:—

On the right the 50th Infantry Regiment, with a mountain battery, under Colonel Petiti, moved out from Kasr Hamed, with orders to march through the rough and hilly country along the coast and the eastern part of the oasis.

The central column, under General Fara, was made up of the 63rd Infantry Regiment (two battalions), and of the 1st Battalion 40th Infantry Regiment, and moved directly on Zuruk village.

The left wing, the Lucca Cavalry Regiment, and mountain battery, was to protect the left of the Italian forces along the marshy ground by the Taurgia lake.

The reserve was formed by the Alpini Battalions Mondovi and Verona, some Eritrean troops, and some batteries of mountain and field artillery. Three or four battalions remained in the entrenched camp at Bu Sceifa. The ships of the School Squadron co-operated, steaming along the coast from Cape Zuruk to Cape Agesira.

The right column soon became hotly engaged, but was reinforced by a battalion from the reserve, and charged with the bayonet, completely routing the Turco-Arab left. The centre column, after a severe fight, occupied Zuruk at 8 a.m., and the troops entrenched themselves, established a field hospital, and brought up stores and reinforcements by means of motor lorries. The way now lay open to Misurata, and a further advance was made in two columns, which entered the town about 3 p.m.

The Italians lost nine killed and 121 wounded; the Turco-Arab losses were estimated at 5,000 men, and over 300 bodies were found and buried immediately after the battle.

Since this battle fortifications have been constructed along the road from the Custom House at Cape Zuruk to Misurata.

The town is being occupied effectively, the civil services, such as provision of police, lighting of the city, and sanitary duties, have been undertaken, and a wireless station has been set up.

(D) The Red Sea.

CAPTURE OF FARSAN ISLANDS.—In the Red Sea at the end of June the Farsan Islands were captured from the Turks by Seyid Idrisse's men aided by Italian naval parties. A subsequent telegram expresses the opinion that a similar movement will be directed on Loheia.

NOTICES OF BOOKS.

A History of the Services of the 19th Regiment, now Alexandra Princess of Wales's Own Yorkshire Regiment, from its Formation in 1688 to 1911. By Major M. L. Ferrar, late 19th Foot, Author of "With the Green Howards in South Africa." London, Eden Fisher and Co., Ltd.

This handsome gilt-edged volume, which commemorates the many brilliant exploits and conspicuous services rendered to the Crown and the Nation by the Green Howards during their long career, is appropriately bound in green cloth, and bears the device of the regimental shako-plate emblazoned on its cover. The regiment derived the sobriquet by which it is familiarly known from the circumstance that it was one of two corps styled Howard's serving with the Duke of Cumberland's army in Flanders during the War of the Austrian Succession; and to distinguish it from the other, it was nicknamed the "Green Howards," from the colour of its grass-green facings. The colour was altered to white in 1881, when many needless and useless changes were made in the usages and customs of the British Army, under the plea of reform; but the change was most unpopular with the officers and soldiers, and twenty years later the regiment was permitted to resume its old colour. In the course of the same unlucky innovations the Regiment lost the number Nineteen, which had distinguished it for close on two centuries; but the old numerical titles continue to be used in the regiments which earned distinction under them, in spite of War Office thunders, and Major Ferrar persists in writing of the Regiment as the Nineteenth to the end of the chapter. He uses the word "Nineteenth" to designate it throughout his narrative, while the titles of all the other regiments of the Line mentioned are given in numerals.

In this regimental history the author has adopted the consecutive method, recording the movements and operations of the Regiment, the careers of its Colonels and other distinguished officers, the changes of dress and equipment, and all the details of regimental life in chronological order. Thus of the eighteen chapters which are comprised in the volume the first contains the narrative of events from 1688 to 1694, and so on to the fifteenth, which treats of the period 1902 to 1911. The last three chapters are similarly devoted to the history of the Second Battalion, raised in 1858. The battalions of a British regiment are really distinct and separate regiments, the officers and men of which are interchangeable, so that the battalions serving abroad may be kept up to strength by the battalions stationed at home. Hence each battalion has a distinct and separate historical record of its own.

During the fifty years that have elapsed since the 2nd Battalion of the Nineteenth Foot was raised, the two battalions have met but once, in 1889, when the 1st Battalion was quartered at Portsmouth and the 2nd Battalion came to that port to embark for India. The only previous occasion on which the Green Howards could boast of a 2nd Battalion was during the Seven Years' War, but that was not for long, for the newly raised battalion was shortly after numbered in the Line as the Sixty-Sixth Foot, and it is now the 2nd Battalion of the Royal Berkshire Regiment. During the long period of the Napoleonic wars, the Nineteenth was absent in the East, and therefore no 2nd Battalion was added to it.

But soon after it was originally raised, it, for a short time, became a two-battalion regiment in this way: when the Prince of Orange landed at Torbay in 1888 to contest the possession of the Throne of England with the unpopular King James the Second, two country gentlemen, Francis Luttrell and Thomas Erle, who joined the usurper's standard, received commissions from him to raise regiments of Foot for his service. Erle's regiment went to Ireland and fought at the battles of the Boyne and Aughrim. A letter from an officer describing his share in the latter battle, has this curious expression, "perceiving the broad way where their horse should come down, as is said before upon our cannon, we crossed and barricaded it with turnpikes"; does this mean that the soldiers improvised *chevaux-de-frise* out of the pikes with which they were armed, and is such practice the origin of the word "turnpike" signifying a barrier on a road? Colonel Luttrell dying two years after he had raised his regiment, the Colonelcy of it was bestowed by King William on Colonel Erle in addition to that of his own, and the two regiments became amalgamated, three companies of the original Erle's being drafted into the original Luttrell's for the campaign in Flanders, and the rest of it being disbanded after the Peace of Ryswick. Erle's regiment fought at the battles of Steenkirk and Nierlanden, and served in the siege of Namur. It was at this time the precedence of the regiments of Foot in the Royal Army was settled, and Colonel Erle's was ranked as the Nineteenth. The author observes that the grenadiers of the Regiment are said to have had sword-bayonets, at this time. We imagine that they had swords and bayonets, but the sword-bayonet does not seem to have been invented so early, nor for long afterwards. And we think he is mistaken in supposing that the hatchets carried by the grenadiers were used as weapons. They were not battle-axes, but were only intended for hewing down the palisades which obstructed the approaches to a fortress.

During the War of the Spanish Succession the Nineteenth Foot was at first employed in Spain and in the West Indies, and only arrived in Flanders in time to share in Marlborough's Pyrrhic victory at Malplaquet. It was again in Flanders in the War of the Austrian Succession, and fought at Fontenoy, Roucoux, and Laffeldt, and was afterwards employed in the siege and reduction of Belle Isle during the Seven Years' War. Its next active service was in the War of American Independence, where it formed part of Lord Rawdon's force in the Carolinas, and shared in the victory at Eutaw Springs, the last considerable action fought during the war. About this time it was sought to establish a territorial connection between the regiments of the Line and the English Counties, and the Nineteenth Foot, which had been originally raised from men of the South-Western Counties, was allotted to the North Riding of Yorkshire. On the breaking out of the French Revolutionary War the Regiment found itself once more in Flanders, and suffered the extremest hardships and privations during the retreat through Holland in the depth of an unusually severe winter. In 1795 it was sent out to garrison the coast towns of Ceylon, which had just been captured from the Dutch; and it remained in the island for a quarter of a century! Though the Portuguese and Dutch had possessed the coast of Ceylon for some two hundred years, the interior of the island was still subject of the King of Kandy, who waged intermittent warfare against the European intruders. In this warfare the mountains, the jungles, and the malarious climate were the most formidable obstacles which our soldiers had to contend with; the Singhalese

were but poor fighting men, and the King's soldiers were mostly Malays and Malabars (Tamils). Three hundred officers and men of the Green Howards perished in the massacre of the British garrison at Kandy in 1803, a disaster very closely resembling in its details the greater calamity which overtook the British garrison of Kabul forty years later. Our author tells us that the Kandyans galled the British garrison by the fire from their grasshopper guns; but gives no explanation of this curious term; probably they were long matchlocks upon rests like the Afghan jezails. We are told elsewhere that the enemy were under the command of the Dessave of the four Corles, and that after the capture of Kandy by the British forces a *feu de joie* was fired on the quapion; no note explanatory of these outlandish terms is vouchsafed to the reader. The old spelling of place-names has not been modernized, and Tuticorin and Madura here figure as Taturcorreen and Mattura. Detachments of the Regiment were more than once despatched to these and other places on the Continent of India to stiffen the Company's Sepoy troops engaged in suppressing the revolts of the Polyars of places with names obscure and unpronounceable. It was not until ten years after the massacre of the British garrison at Kandy that the kingdom was finally conquered, and its truculent monarch deported as a State prisoner to India.

In 1820 the Green Howards returned to England with such diminished numbers that they found the *dépôt* stronger than the Regiment. They were for some years stationed in Ireland, employed in attending executions, escorting prisoners, and hunting for illicit whisky stills. Long spells of foreign service in the West Indies and the Mediterranean, alternated with short spells of home service till they were despatched to the East in 1854; they fought at Alma and Inkerman, and saw the siege of Sebastopol through. The next service of the Regiment was in the Indian Mutiny and on the North-west frontier. The chapter describing the Boer War is abridged from the fuller account in the author's well-known book "With the Green Howards in South Africa." The 2nd Battalion underwent its baptism of fire in the Tirah campaign of 1897.

It was in 1875 that the presentation of colours to the 1st Battalion by Alexandra Princess of Wales at Sheffield led to the association of Her Most Gracious Majesty with the Regiment which now bears her name, and has received many tokens of her Royal favour. The presentation of colours to both battalions has more than once taken place in the drawing-room at Buckingham Palace, reminding one of by-gone days when the standards of Companies of the French King's *Maison du Roi* were lodged in the Monarch's bed-chamber, whence they were fetched by the colour-party with much ceremony when required for parade or duty.

As has happened with so many of our old regiments, the early records of the Nineteenth Foot were lost during the American War of Independence when a convoy including the baggage of the Regiment was captured by the enemy. Major Ferrar has, however, succeeded in amassing a wealth of information about the Regiment, giving lists of the officers engaged in every campaign or general action at the close of each chapter, with much information as to their previous or subsequent careers. Sometimes this information has been inadvertently recapitulated in the case of officers who have served in both battalions. Many complimentary orders are included in the text, penned by General Officers, Commanding and Colonial Governors, praising the conduct of the Regiment and thanking it for its services. Major-General Stephenson, commanding at

Barborton during the Boer War, alluded to it in a general order as "this grand old Regiment." The book is not entirely free from misprints. The statement that the rifle in use in 1812 was a smoothbore musket (page 159) must be due to a slip of the pen. At page 309 the year 1902 is given by mistake instead of 1892. At page 411 Safdar Jung's tomb is miscalled Sagaar Jung's tomb.

The book is profusely illustrated with portraits of the Colonels and other distinguished officers connected with the Regiment, reproductions of medals struck to commemorate battles and sieges, and coloured prints illustrative of the dress worn by officers and men at different epochs. The frontispiece is a signed portrait of Her Majesty Queen Alexandra, and there is a facsimile of an autograph letter from Her Majesty. The appendix includes a list of the Colonels of the Regiment, casualty rolls, honours and rewards, and the scores of the quick and slow marches of the Regiment, and the funeral march. The two latter were presented by the Empress Maria Theresa to Colonel the Honourable Sir Charles Howard when he was accredited to her Court on a diplomatic mission.

F. H. T.

IMPORTANT NAVAL AND MILITARY LITERATURE.

NAVAL.

[A selected list of books added to the Admiralty Library during July, 1912. Supplied by courtesy of the Admiralty Librarian.]

THE TOBERMORY ARGOSY. A Problem of the Spanish Armada. By R. P. Hardie. Edinburgh, 1912.

THE RUSSIAN OIL FIELDS AND PETROLEUM INDUSTRY. By John Mitzakis. London, 1911.

SEEKRIEGSGESCHICHTE IN IHREN WICHTIGSTEN ABSCHNITTEN MIT BERÜCKSICHTIGUNG DER SEETAKTIK. (*The History of the most important Periods of Maritime War with reference to Naval Tactics*). By Kapitän Alfred Stenzel. Hannover, 1907-11.

THE DEPTHS OF THE OCEAN. By Sir John Murray and Dr. Johan Hjort. London, 1912.

THE LOSS OF THE TITANIC. Its Story and its Lessons. By Lawrence Beesley. London, 1912.

INTERIOR BALLISTICS. By Colonel James M. Ingalls (U.S. Army). New York, 1912.

A TREATISE ON SURVEYING. By Reginald Middleton, Osbert Chadwick, and J. Du T. Bogle. London, 1911.

THE ENGLISH FACTORIES IN INDIA, 1618-1641. A Calendar of Documents in the India Office, British Museum and Public Record Office. By William Foster. Oxford, 1906-1912.

FESTIGKEIT DER SCHIFFE. (*Stability of Ships*). By Felix Pietzker (Marine-Schiffbaumeister). Berlin, 1911.

THE DYNAMICS OF MECHANICAL FLIGHT. Lectures delivered at the Imperial College of Science and Technology, March, 1910 and 1911. By Sir G. Greenhill. London, 1912.

THE CONDUCT OF ADMIRALS HAWKE, KEPPEL, AND PALLISER COMPARED. London, 1779.

A VINDICATION OF THE LORDS OF THE ADMIRALTY, ON THEIR CONDUCT TOWARDS ADMIRAL KEPPEL: IN ANSWER TO A LATE ADDRESS. By a Gentleman of the Inner Temple. London, 1779.

PLAIN SUGGESTIONS OF A BRITISH SEAMAN, RESPECTING THE PRESENT ADMIRALTY, AND THE MODE OF CONSTITUTING THE BOARD, &c., &c. AS ALSO THE FIGURE MADE BY HIS COUNTRY ON THE SEAS DURING THE PRESENT WAR. WITH LOOSE HINTS FOR A PLAN FOR MANNING THE FLEET WITHOUT PRESSING. London, 1794.

AN ESSAY TOWARDS DECIDING THE IMPORTANT QUESTION, WHETHER IT BE A NATIONAL ADVANTAGE TO BRITAIN TO INSURE THE SHIPS OF HER ENEMIES? Addressed to the Right Honorable Henry Pelham, Esq. By (Corbyn Morris). London, 1747.

THE APPEAL OF BRITANNICUS, TO THE BRITISH PUBLIC, ON BEHALF OF THE ROYAL NAVY. By an Officer. Plymouth Dock, 1819.

DESCRIPTION EXACTE DE TOUT CE QUI S'EST PASSÉ DANS LES GUERRES ENTRE LE ROY D'ANGLETERRE, LE ROY DE FRANCE, LES ESTATS DES PROVINCES UNIES DU PAYS-BAS, AND L'EVEQUE DE MUNSTER. (*Exact description of the wars between the Kings of England and France, the United Provinces and the Bishop of Munster*), 1664-1667. Amsterdam, 1668.

MILITARY.

[A selected list of books recently added to the War Office Library, supplied by courtesy of the War Office Librarians].

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LA RÉPUBLIQUE DE LIBÉRIA. (*The Liberian Republic*). By L. Jore. 220 pp. Map. 8vo. Paris, 1912.

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NAVAL.

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REVUE MARITIME. Paris: **May, 1912.**—Not yet received.

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LA MARINE FRANCAISE. Paris: **June, 1912.**—Germany's policy put into practice. Submarines in the French and German Navies. Anglo-German relations. The catastrophe to the "Vendémiaire." Alleged abandonment of the "Dreadnought" type.

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*—to be continued.

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ITALY.

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MILITARY.

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REVUE MILITAIRE GÉNÉRALE. Paris: **July, 1912**.—The German Staff College. Infantry in offensive battles. The German Field Service Regulations. Succouring the wounded.* Unity of doctrine by land and sea. Studies of the Russo-Japanese War (character sketches of the commanders).

*—to be continued.

†—continued.

§—concluded.

GERMANY.

MILITÄR WOCHENBLATT. Berlin: No. 83. 2nd July, 1912.—In the Swiepwald (1866). Artillery in the infantry attack * (a reply by General Bernhardt, concluded in No. 84). Underground rifle ranges in America. No. 84.—Napoleon's concentration in 1812. § No. 85.—Principles of the theory of war (review of Reinhold Wagner's book, concluded in No. 86). Notes from the Austro-Hungarian Army. Review of *Nauticus*, 1912. Military technical notes, aeronautics. No. 86.—The French operations in Morocco * (attack on Fez; Gouraud's operations, concluded in No. 87). Notes from the French Army. Payment for *Redifs* in Turkey. No. 87.—Artillery in co-operation with other arms. Notes from the French Army † (concluded in No. 88) (report on 1911 manœuvres). Organization of Rumelian gendarmerie, by General Imhof. No. 88.—The Russian campaign of 1812† (Witebsk), continued in No. 89. The Turco-Italian War† (capture of Rhodes). Importance of bayonet fighting in Japanese opinion. No. 89.—Diary of events of July, 1812. Infantry in actions of all arms combined† by Col. Hoppenstedt (concluded in No. 90). Corps and divisional commanders in Russia. No. 90.—The South African Defence Bill. § No. 91.—The action at Burkersdorf, 21st July, 1762. Recollections of 1866, 1870/71.* (Nachod). Italy's Colonial Army and Ministry of the Colonies. No. 92.—Salamanca, 22nd July, 1812. Importance of a disposition in depth (*Staffelung*) for artillery.

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UNITED STATES.

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*—to be continued.

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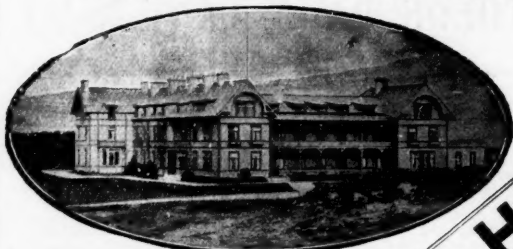
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